

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
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BACHELOR OF TECHNOLOGY
AERONAUTICAL ENGINEERING

COURSE STRUCTURE & SYLLABUS
(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ”Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- “Program” means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

DEPARTMENT OF AERONAUTICAL ENGINEERING

VISION

Department of Aeronautical Engineering aims to be indispensable source in Aeronautical Engineering which has a zeal to provide the value driven platform for the students to acquire knowledge and empower themselves to shoulder higher responsibility in building a strong nation.

MISSION

a) The primary mission of the department is to promote engineering education and research.

(b) To strive consistently to provide quality education, keeping in pace with time and technology.

(c) Department passions to integrate the intellectual, spiritual, ethical and social development of the students for shaping them into dynamic engineers.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: PROFESSIONALISM & CITIZENSHIP To create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, ecological and economic issues.
PEO2: TECHNICAL ACCOMPLISHMENTS To provide knowledge based services to satisfy the needs of society and the industry by providing hands on experience in various technologies in core field.
PEO3: INVENTION, INNOVATION AND CREATIVITY To make the students to design, experiment, analyze, interpret in the core field with the help of other multi disciplinary concepts wherever applicable.
PEO4: PROFESSIONAL DEVELOPMENT To educate the students to disseminate research findings with good soft skills and become a successful entrepreneur.
PEO5: HUMAN RESOURCE DEVELOPMENT To graduate the students in building national capabilities in technology, education and research.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

To mould students to become a professional with all necessary skills, personality and sound knowledge in basic and advance technological areas.

1. To promote understanding of concepts and develop ability in design manufacture and maintenance of aircraft, aerospace vehicles and associated equipment and develop application capability of the concepts sciences to engineering design and processes.
2. Understanding the current scenario in the field of aeronautics and acquire ability to apply knowledge of engineering, science and mathematics to design and conduct experiments in the field of Aeronautical Engineering.
3. To develop leadership skills in our students necessary to shape the social, intellectual, business and technical worlds.

PROGRAM OUTCOMES
(POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
12. Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

AERONAUTICAL ENGINEERING

COURSE STRUCTURE

I Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0001	English	2			2	30	70
2	R18A0021	Mathematics – I	4	1		4	30	70
3	R18A0013	Engineering Chemistry	3			3	30	70
4	R18A0261	Basic Electrical and Electronics Engineering	3			3	30	70
5	R18A0501	Programming for Problem Solving	3			3	30	70
6	R18A0082	Engineering/IT Workshop	-		4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-		3	1.5	30	70
8	R18A0289	Basic Electrical and Electronics Engineering Lab	-		3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2		-	0	100	-
		TOTAL	**17**	**1**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

I Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0002	Professional English	2			2	30	70
2	R18A0022	Mathematics – II	4	1		4	30	70
3	R18A0012	Engineering Physics	3			3	30	70
4	R18A0502	Object Oriented Programming	3			3	30	70
5	R18A0302	Engineering Graphics	1		4	3	30	70
6	R18A0083	Engineering Physics/Chemistry Lab	-		4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-		3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-		3	1.5	30	70
		TOTAL	**13**	**1**	**14**	**20**	**240**	**560**

B. Tech (ANE) – III Semester (II Year – I Semester)

(5 Professional core courses+1 Eng Science course+1 mandatory course+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2101	Mechanics of Fluids	3	0	0	3	30	70
2	R18A2102	Applied Mechanics	3	0	0	3	30	70
3	R18A2103	Engineering Thermodynamics	3	0	0	3	30	70
4	R18A2104	Introduction to Aeronautical Engineering	3	0	0	3	30	70
5	R18A2105	Aircraft Production Technology	3	0	0	3	30	70
6	R18A2106	Aerospace materials and composites	3	0	0	3	30	70
7	R18A2181	Aircraft Production Technology Lab	0	0	3	1.5	30	70
8	R18A2182	Aircraft Engineering Drawing Lab	0	0	3	1.5	30	70
9	R18A0014	*Environmental Sciences	2	0		-	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

**Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree*

B. Tech (ANE) – IV Semester (II Year – II Semester)

(4 Professional core courses+ 1 Basic Science Course+1 Open Elective+ 1 Mandatory Course+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2107	Aerodynamics	3	0	0	3	30	70
2	R18A2108	Mechanics of Solids	3	0	0	3	30	70
3	R18A2109	Air Breathing Propulsion	3	0	0	3	30	70
4	R18A2110	Aircraft Performance	3	0	0	3	30	70
5	R18A0024	Probability and Statistics	3	0	0	3	30	70
6	OE – I	**OPEN ELECTIVE – I**	3	0	0	3	30	70
7	R18A0391	Mechanics of Solids and Mechanics of Fluids Lab	0	0	3	1.5	30	70
8	R18A0392	CAD Lab	0	0	3	1.5	30	70
9	R18A0004 R18A0005	* Foreign Language: French **or** * Foreign Language German	2	-	-	0	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

**Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree*

OPEN ELECTIVE - I

1. **R18A0451**	Digital Electronics	4. **R18A0351**	Intellectual PropertyRights
2. R18A0551	Database Systems	5. **R18A0352**	Green Energy Systems
3. R18A0553	Data Structures Using Python	6. R18A0555	Data Visualization

B. Tech (ANE) – V Semester (III Year – I Semester)

(3 Professional core courses+1 H & S course+1 Professional Elective course+1 Open Elective+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2111	Aircraft Vehicle Structures	3	0	0	3	30	70
2	R18A2112	Aircraft Stability and Control	3	0	0	3	30	70
3	R18A0061	Managerial Economics and Financial Analysis	3	0	0	3	30	70
4	R18A2113	High Speed Aerodynamics	3	0	0	3	30	70
5	R18A2131 R18A2132 R18A2133	**PROFESSIONAL ELECTIVE – I** 1. Introduction to Space Technology 2. Mechanisms and Machine Design 3. Wind Tunnel Techniques	3	0	0	3	30	70
6	OE – II	**OPEN ELECTIVE – II**	3	0	0	3	30	70
7	R18A2183	Aerodynamics and Propulsion Lab	0	0	3	1.5	30	70
8	R18A2184	Aircraft Structures Lab	0	0	3	1.5	30	70
9	R18A0521	*Cyber Security	2	0	0	0	50	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

**Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree*

OPEN ELECTIVE - II

1. **R18A1251** Management Information Systems
2. **R18A0552** Introduction to JAVA Programming
3. **R18A1252** Software Project Management
4. **R18A0353** Enterprise Resource Planning
5. **R18A0354** Nano Technology

B. Tech (ANE) – VI Semester (III Year – II Semester)

(3 Professional Core courses+ 1 Professional Elective course+ 1 Open Elective course+2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2114	Finite Element Analysis	3	0	0	3	30	70
2	R18A2115	Aerospace Propulsion Systems	3	0	0	3	30	70
3	R18A1205	Artificial Intelligence	3	0	0	3	30	70
4	R18A2134 R18A2135 R18A2136	**PROFESSIONAL ELECTIVE – II** 1. Flight Scheduling Operations 2. Air Transportation systems 3. Airframe Structural Design	3	0	0	3	30	70
5	OE – III	**OPEN ELECTIVE – III**	3	0	0	3	30	70
6	R18A2185	Computational Structures Lab	0	0	3	1.5	30	70
7	R18A2186	Programming Language for Mathematical Models Lab	0	0	3	1.5	30	70
8	R18A2190	Mini Project	0	0	6	3	30	70
9	R18A0006	*Technical communication and soft skills	2	0	0	0	100	-
		TOTAL	**17**	**0**	**12**	**21**	**340**	**560**

**Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree*

OPEN ELECTIVE – III

1. **R18A0452** ROBOTICS & AUTOMATION
2. **R18A0453** IOT and Application
3. **R18A1253** Software Testing Techniques
4. **R18A0355** Total Quality Management
5. **R18A0251** Electrical systems & applications
6. **R18A0554** operating system concepts

B. Tech (ANE) – VII Semester (IV Year – I Semester)
(4 Professional core courses+ 1 Professional Elective courses+ 2 Labs)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2116	Computational Aerodynamics	3	0	0	3	30	70
2	R18A2117	Mechanical Vibrations	3	0	0	3	30	70
3	R18A2118	Flight Vehicle Design	3	0	0	3	30	70
4	R18A2119	Avionics	3	0	0	3	30	70
5	R18A2137 R18A2138 R18A0318	**PROFESSIONAL ELECTIVE – III** 1. CAD/CAM 2. Aircraft systems 3. Heat Transfer	3	0	0	3	30	70
6	R18A2187	Computational Aerodynamics Lab	0	0	3	1.5	30	70
7	R18A2188	Flight Vehicle Design Lab	0	0	3	1.5	30	70
8	R18A2191	**Project – I**	-	-	6	3	30	70
		TOTAL	**15**	**0**	**12**	**21**	**240**	**560**

B. Tech (ANE) – VIII Semester (IV Year – II Semester)
(1 Professional Core Course + 2 Professional Elective Courses + Major Project)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A2120	Aircraft Maintenance Engineering	3	0	0	3	30	70
2	R18A2139 R18A2140 R18A2141	**PROFESSIONAL ELECTIVE – IV** 1. Helicopter Engineering 2. Advanced Computational Aerodynamics 3. Analysis of Composite Structure	3	0	0	3	30	70
3	R18A2142 R18A2143 R18A2144	**PROFESSIONAL ELECTIVE – V** 1. Airline and Airport Management 2. Aero-elasticity 3. Hypersonic Aerodynamics	3	0	0	3	30	70
4	R18A2192	**Project – II**	0	0	12	6	60	140
5		**TOTAL**	**9**	**0**	**12**	**15**	**150**	**350**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE **L T/P/D /C**
2/ - / - / - / 2

(R18A0001)ENGLISH

INTRODUCTION:

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected act as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing to ensure error-free writing.
4. To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
5. To expose students to various techniques of reading skills which hone their comprehensive skills.

SYLLABUS:

Unit –I

Chapter entitled "***The Road Not Taken****" by* Robert Frost (8 hrs)
Grammar –Tenses and Punctuation (Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading – Techniques for effective reading-Reading Exercise –Type 1

Unit – II

Chapter entitled "***Abraham Lincoln's Letter to His Son's Teacher***" (7 hrs)
Grammar – Voices, Transitive and Intransitive Verbs

Vocabulary – Synonyms, Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Skimming, scanning- Reading Exercise –Type 2

Unit – III

Chapter entitled "***War***" by L. Pirandello (6 hrs)
Grammar –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Comprehension- Reading Exercise – Type 3

Unit – IV

Chapter entitled "***J K Rowling's Harvard Speech***" (6 hrs)
Grammar – Articles, Misplaced Modifiers
Vocabulary – One-Word Substitutes
Writing – Précis Writing
Reading – Intensive and Extensive reading - Reading Exercise – Type 4

Unit –V

Sentence Structures (phrases and clauses) (7 hrs)
Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading – Identifying Errors - Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. write formal or informal letters and applications for different purposes.
2. select and extract relevant information through skimming and scanning.
3. utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
4. draft concise emails following professional email etiquette.
5. enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE

L	T/P/D	C
4	1/-/-	4

(R18A0021) MATHEMATICS -I

Course Objectives: To learn

1. The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the eigen vectors of a given matrix.
2. Finding maxima and minima of functions of several variables.
3. Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)
4. How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
5. Solving differential equations using Laplace Transforms.

UNIT I: Matrices

Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:Functions of Several Variables

Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for two variables.

UNIT III: Ordinary Differential Equations

First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV: Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t", Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.

ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

iii) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

i) Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.

ii) Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .

iii) Engineering Mathematics by N.P Bali and Manish Goyal.

Course Outcomes: After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first and higher order differential equations.
4. Solve first order linear and non-linear partial differential equations.
5. Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -ANE

L	T/P/D	C
3	-/-/-	3

(R18A0013) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
2. To analyze microscopic chemistry in terms of atomic and molecular orbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
5. To analyze different types of fuels and their applications in various engineering fields.

Unit-I: Electrochemistry and Corrosion (12 lectures)

Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

Unit -II: Atomic and Molecular Structure (8 lectures)

Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

Unit -III: Water and its Treatment (**6 lectures**)

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

Unit-IV: Organic Reactions (10 lectures)

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic addition reactions; addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

Unit-V: Energy Sources (8 lectures)

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal - proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited , 2018.

Reference Books:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:

1. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
2. Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
3. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
4. Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.

5. Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

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B. TECH- I- YEAR- I- SEM -ANE

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(R18A0261) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

OBJECTIVES:

1. To introduce the concept of electrical circuits and its components.
2. To introduce the concepts of diodes & transistors, and
3. To impart the knowledge of various configurations, characteristics and applications.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws. (Simple Problems).

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks and meshanalysis

Network Theorems: Thevenin's Theorem, Norton's Theorem and Superposition Theorem.

UNIT-III:

Electrical Machines (elementary treatment only):

DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

Single phase transformer: principle of operation, constructional features and emf equation.

UNIT –IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode applications, Zener Diode: characteristics , Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

UNIT –V:

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations. (elementary treatment only)

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University.
2. Basic Electrical and electronics Engineering-D P Kothari. I J NagarathMcGraw Hill Education.
3. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998. 3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
3. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2 nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
4. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
5. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

OUTCOMES: After this course, the student will be able

1. To analyze and solve electrical circuits using network laws and theorems.
2. To identify and characterize diodes and various types of transistors.
3. Design and analyse the DC bias circuitry of BJT
4. Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

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B. TECH- I- YEAR- I- SEM –ANE

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(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C to solve problems.

UNIT - I

Introduction to Computing – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

Statements-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

Functions-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

Arrays- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

Strings- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

Pointers- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

Structures- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.

COURSE OUTCOMES:

1. Demonstrate the basic knowledge of computer hardware and software.
2. To formulate simple algorithms for arithmetic and logical problems.
3. To translate the algorithms to programs (in C language).
4. To test and execute the programs and correct syntax and logical errors.
5. Ability to apply solving and logical skills to programming in C language and also in other languages.

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B. TECH – I- YEAR –I SEM- ANE

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(R18A0082)ENGINEERING WORKSHOP/IT WORKSHOP

COURSEOBJECTIVES:

1. Student able to learn about different tools used in the lab
2. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student able to learn about different Carpentry and Fitting tools

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

COURSE OUTCOMES:

1. Students can understand different machine shop operations
2. Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student learned about metal cutting processes

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B. TECH- I- YEAR- I- SEM -ANE

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(R18A0083) IT WORKSHOP LAB

OBJECTIVES:

1. The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point
2. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.
3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.
4. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.
5. HTML introduction for creating static web pages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.

Header and Footer

Bullets and Numbering

Drawing Toolbar: Auto shapes, Textboxes, etc

Design Template

Introduction to custom animation.

b) **Create a presentation to conduct a creativity session using the following tools**:

1. Slide transition
2. Master slide view
3. Insert picture – clipart, image
4. Action button
5. Drawing tool bar – lines, arrows
6. Hyperlink
7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage's using HTML.

Text Books:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

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B. TECH- I- YEAR- I- SEM -ANE	L	T/P/D	C
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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

OBJECTIVES:

1. Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.
6. Programming using gcc compiler in Linux.

Week 1:

a) Write a C program to find sum and average of three numbers.
b) Write a C program to find the sum of individual digits of a given positive integer.

Week 2:

a) Write a C program to generate the first n terms of the Fibonacci sequence.
b) Write a C program to generate prime numbers from 1 to n.
c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:

a) Write a C program to check whether given number is perfect number or not.
b) Write a C program to check whether given number is strong number or not.

Week 4:

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to perform arithmetic operations using switch statement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursive function.
b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.

b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program to Sort the Array in an Ascending Order

c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.

b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.

b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

Week 12:

a) Write C program to count the number of lines, words and characters in a given text.

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V.RAjaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

OUTCOMES:

1. Acquire knowledge about the basic concept of writing a program.
2. Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3. Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
4. Understand the Role of Functions involving the idea of modularity.
5. Understand the Concept of Array and pointers dealing with memory management.
6. Learn Structures and unions through which derived data types can be formed.

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B. TECH- I- YEAR- I- SEM –ANE

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(R18A0289) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

OBJECTIVES:

1. To Design Electrical Systems.
2. To Analyze A Given Network By Applying Various Network Theorems.
3. To Expose The Students To The Operation Of DC Generator.
4. To Expose The Students To The Operation Of DC Motor and Transformer.

CYCLE – 1

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Superposition theorem.
5. Swinburne's test on DC shunt machine.
6. OC & SC tests on single phase transformer.

CYCLE – 2

1. PN Junction diode characteristics.
2. Zener diode characteristics.
3. Half wave rectifier with and without filter.
4. Full wave rectifier with and without filter.
5. Transistor CB Characteristics (Input And Output)
6. Transistor CE Characteristics (Input And Output)

NOTE: Any 10 of Above Experiments Are To Be Conducted

OUTCOMES:

After successfully studying this course, students will:

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines.

3. Acknowledge the principles of operation and the main features of electric machines and their applications.
4. Acquire skills in using electrical measuring devices.

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B. TECH- I- YEAR- I- SEM -ANE **L T/P/D C**

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(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVE
(Mandatory Course)

INTRODUCTION:

Human values are the virtues that guide us to take into account human element when one interacts with other human beings. It's both what we expect others to do for us and what we aim to give to other human beings. These human values give the effect of bonding, comforting and reassuring.

OBJECTIVES:

This introductory course input is intended:

1. to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. to facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. to highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:
Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.
Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)
- from family to world family!

UNIT - IV:
Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:
Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life.

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B. TECH- I- YEAR- II- SEM -ANE

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(R18A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

SYLLABUS:

UNIT-I (7 hrs)

Listening - Bill Gate's TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects and Persons
Grammar - Finite and Non-finite verbs
Vocabulary - Business Vocabulary
Writing - Paragraph Writing

Unit –II (8 hrs)

Listening - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

Unit –III (8 hrs)

Listening - Sample Interviews (videos)

Speaking - Mock Interviews
Grammar - Direct and Indirect Speech
Vocabulary - Standard Abbreviations (Mini Project)
Writing - Job applications I (Cover Letter)

Unit – IV (6 hrs)

Listening - Telephonic Interviews
Speaking - Telephonic Expressions
Grammar - Auxiliary verbs
Vocabulary - Word Analogy-I
Writing - Job Application II (Resume)

Unit – V (5 hrs)

Listening - Tanmay Bhakshi's ITU interview
Speaking - Professional Etiquette
Grammar - Common Errors
Vocabulary - Word Analogy-II
Writing - Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERNCE BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. draft coherent and unified paragraphs with adequate supporting details.
2. demonstrate problem solving skills, decision-making skills, analytical skills.
3. comprehend and apply the pre-interview preparation techniques for successful interview.
4. achieve expertise in writing resume and cover letter formats.
5. understand the steps of writing 'Reports and Abstract'.

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B. TECH- I- YEAR- II- SEM -ANE

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(R18A0022)MATHEMATICS-II

OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
2. To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
3. Evaluation of improper integrals using Beta and Gamma functions.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I: Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae. Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II: Numerical Methods

Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

Curve fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III: Beta and Gamma functions

Introduction of improper integrals- Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V: Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii) Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

i) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

Course Outcomes: After learning the contents of this paper the student must be able to

1. Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
2. Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3. Find a numerical solution for a given differential equation.
4. Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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B. TECH- I- YEAR- II- SEM -ANE	L	T/P/D	C
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(R18A0012) ENGINEERING PHYSICS

COURSE OBJECTIVES:

1. To understand the basic concepts of oscillations exhibited by various systems in nature.
2. To understand the basic concepts of light through interference and diffraction.
3. To understand band structure of the solids and classification of materials.
4. To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
5. To be able to distinguish ordinary light with a laser light and their applications in different fields.

UNIT – I

HARMONIC OSCILLATIONS (7Hours)

Mechanical and electrical simple harmonic oscillators, complex number notation and phasor representation of simple harmonic motion, damped harmonic oscillator: over, critical and lightly-damped oscillators; Energy decay in damped harmonic oscillator, Quality factor, forced damped harmonic oscillator.

UNIT – II

WAVEOPTICS (10Hours)

Huygen's principle, Interference: Superposition of waves, interference of light by division of wave front and amplitude, Newton's rings, Michelson interferometer, Diffraction: difference between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, Diffraction grating: Grating spectrum and resolving power.

UNIT- III

INTRODUCTION TO SOLIDS (7 Hours)

Free electron theory, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny modal , E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semi conductors and insulators.

UNIT – IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS (10 Hours)

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, Internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT-V

LASERS (6Hours)

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

COURSE OUTCOMES: After completion of studying Engineering Physics the student is able to,

1. Analyze the various oscillations made by different oscillating bodies in nature.
2. Learn to design a device to go to maximum accuracy in measuring the dimensions optically.
3. Get the knowledge of classification of materials which is used for various applications in material technology.
4. Learn dielectric, magnetic properties of the materials and apply them in material technology.
5. Learn the principles, production of LASER beam and application of LASER in various fields.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

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B. TECH- I- YEAR- II- SEM -ANE

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3	-/-/-	3

(R18A0502)OBJECT ORIENTED PROGRAMMING

OBJECTIVES

1. To teach the student the concepts of object oriented and generic programming.
2. To differentiate between object oriented programming and procedural programming.
3. To design applications using object oriented features
4. To teach the student to implement object oriented concepts

Unit I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Encapsulation, Inheritance and Polymorphism, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures & Loops.

Unit-II

Functions, Classes and Objects:

Introduction of Classes, Class Definition, Defining a Members,Objects,Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friend Functions.

Unit-III

Constructors, Destructors, Inheritance:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Multiple Constructors in a Class, Destructors.

Inheritance :

Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Unit-IV

Pointers, Virtual Functions and Polymorphism:

Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Overloading- Function Overloading, Operator overloading.

Unit-V

Templates and Exception handling:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

Text Books:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Educ

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B. TECH- I- YEAR- II- SEM -ANE

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(R18A0302) ENGINEERING GRAPHICS

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

Sections and developments of solids
Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids.

UNIT – V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

TEXT BOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
2. Engineering Drawing, N.D. Bhatt

3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

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B. TECH- I- YEAR- II- SEM -ANE

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(R18A0083) ENGINEERING PHYSICS / CHEMISTRY LAB

(Any 8 experiments compulsory)

OBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics and electronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physics lab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. C-R circuit – Time Constant of RC circuit
8. Characteristics of LED.
9. Characteristics of a Solar cell.
10. Evaluation of numerical aperture of optical fiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**, V.G.S.publications.
2. Engineering physics practical lab manual – **MRCET.**

OUTCOMES

1. The students learn the concepts of error, analyze and try to formulate new solutions to the problems related to engineering physics.

2. B.Tech students basically learning the mechanical behavior of the wire and practically determining the elastic constant. Transverse and longitudinal waves are practically studied. Variation of the magnetic fields along with terrestrial magnetism is practically studied.
3. Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determined experimentally.
4. Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practically studied.
5. The students learn experimental skills to design new experiments suitable for requirements in different fields(industrial, medical, scientific fields etc.)

ENGINEERING CHEMISTRY LAB

(Any Eight Experiment Compulsory)

OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

1. Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
2. Practical implementation of fundamental concepts.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTA method.

Instrumental Methods:
Colorimetry:

2. Determination of Ferrous iron in cement by Colorimetric method
3. Estimation of Copper by Colorimetric method.

Conductometry:

4. Estimation of HCl by Conductometric titrations.

5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:

6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

Preparation:

8. Preparation of Aspirin.

Physical properties:

9. Determination of Viscosity of sample oil by Redwood Viscometer.
10. Determination of Surface Tension of a given liquid by Stalagmometer.

Text Book:

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

Suggested Readings:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.

OUTCOMES: At the end of the course students will be able to

1. Estimate the total hardness present in a sample of water.
2. Select lubricants for various purposes and determine the surface tension of a given liquid.
3. Prepare synthetic drug molecule.
4. Determine the strength of an acid by conductometric and potentiometric methods.
5. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

Objectives:

1. To strengthen problem solving ability by using the characteristics of an object-oriented approach.
2. To design applications using object oriented features
3. To handle Exceptions in programs.
4. To teach the student to implement object oriented concepts

Week 1:

Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positive integer.

b) Write a C++ program to generate the first n terms of the sequence.

Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

b) Write a C++ program to find both the largest and smallest number in a list of integers.

Week 4:

a) Write a C++ program to sort a list of numbers in ascending order.

b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation

Week 5

a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.

b) Program to illustrate default constructor, parameterized constructor and copy constructors

c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student

Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.

b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.

b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.

d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

a) Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

a) Write a Template Based Program to Sort the Given List of Elements.

b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.

b) Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

Text Books:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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(R18A0081)ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on phonetic knowledge of the English language and its use in everyday situations and contexts.

OBJECTIVES:

1. To expose students to a variety of self-instructional, learner-friendly modes of language learning
2. To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
3. To enable students to overcome public speaking anxiety and equip them to become employable.
4. To familiarize students with formal telephonic expressions by means of appropriate tone.
5. To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking Activity - JAM Session- Greetings – Taking Leave – Introducing Oneself and Others.

UNIT –II

CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation
ICS Lab: Situational Dialogues/Role Plays - Making Requests and Seeking Permissions.

UNIT –III

CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)
ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

   System Requirement (Hardware component):

   Computer network with LAN with minimum 60 multimedia systems with the following specifications:

   i) P –IV Processor
      a) Speed –2.8 GHZ
      b) RAM –512 MB Minimum
      c) HardDisk –80 GB
   ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

   A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

DISTRIBUTION AND WEIGHTAGE OF MARKS

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

OUTCOMES:

Students will be able to:

1. understand the importance of learning phonetics.
2. learn how to pronounce words using phonetic transcription.
3. know the importance of speaking English with rhythm and intonation.
4. effectively participate in JAM session.
5. use polite expressions in all formal situations.
6. effectively communicate through telephone.

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II Year B. Tech, ANE-I Sem

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(R18A2101)MECHANICS OF FLUIDS

Objectives:

- The student will gain insight into a number of potentially useful phenomena involving movement of fluids.
- He/she will learn to do elementary calculations for engineering application of fluid motion.
- This course also prepares the student for more advanced courses such as Aerodynamics- I & -II.

UNIT I

Fluid Properties: Density, specific weight, specific gravity, surface tension & capillarity, Newton's law of viscosity, incompressible & compressible fluid.

Hydrostatic forces on submerged bodies: Pressure at a point, Pascal's law, pressure variation with temperature and height, Center of pressure on vertical surfaces.

Manometers- simple and differential manometers, inverted manometers, micro manometers, Pressure gauges.

UNIT II

Fluid Kinematics: Stream line, path line, streak line, stream tube, Classification of flows: steady, unsteady, uniform, non uniform, laminar, turbulent flows. One dimensional & two dimensional approximation, 2-D flow in wind tunnel, Continuity equations for 1-D and 2-D flows both compressible and incompressible, Velocity potential function and stream function.

UNIT III

Fluid Dynamics: Surface & body forces, momentum equation, Euler equation, Bernoulli's equation for flow along a stream line.

Flow measurements: pressure, velocity and mass flow rate, viscosity, venturi meter and orifice meter.

Flow of through pipes: Darcy's Weisbach Equation, major and minor losses.

UNIT IV

Boundary Layer flows: Introductory concepts of boundary layer, Prandtl's boundary layer hypothesis, Boundary layer growth along a flat plate. Boundary layer thickness (Displacement, Energy and Momentum), Von Karman's Momentum Integral Equation, Drag forces due to laminar and turbulent boundary layer on flat plate.

Separation of boundary layer: Adverse pressure gradient and Sharp bending/turning of surface. Methods of preventing separation of boundary layer.

UNIT V

Dimensional and Model Analysis: Dimensional homogeneity, Methods of Dimensional Analysis, Buckingham's π-theorem, Model Analysis, Simiitude: Types of similarities, Dimensionless numbers, Similarity laws.

Text Books:

1. Engineering Fluid mechanics – K.L . Kumar, S.Chand & Co.
2. Introduction to Fluid Mechanics and Fluid machines – S.K. Som and G. Biswas

3. Fluid Mechanics and Hydraulic Machines – RK Bansal, Laxmi Publications
4. Fundamentals of Aerodynamics, Anderson, Jr., J.D., International edition, McGraw Hill, 2001, ISBN: 0-07-118146-6.

Reference Books:

1. Fluid Mechanics – Frank M and White, Mc-Grawhill.
2. Fluid Mechanics- Fox and Mc Donald
3. Fluid Mechanics – E. Rathakrishnan

Outcomes:

- Students can define the governing equations of fluid flow problems.
- It makes the student ready to understand about aerodynamics.
- Students can able to create models for experimental analysis.

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II Year B. Tech, ANE-I Sem

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(R18A2102) APPLIED MECHANICS

Unit – I

Introduction to Engineering Mechanics – Basic Concepts. Resultants of Force System**:** Parallelogram law –Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems -Equilibrium of Spatial Systems.

Unit – II

Centroid and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Unit – III

Moments of Inertia: Definition – Perpendicular and parallel axes theorems, Polar Moment of Inertia – Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia – mass moment of inertia of composite bodies.

Unit – IV

Kinematics: Analysis of Pin Jointed Plane Frames: Determination of Forces in members of plane, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever & simply supported trusses by method of joints, method of sections.

Kinetics of particles: D'Alemberts principle for plane motion and connected bodies.

Unit – V

Introduction to structural members: Introduction to different beams with end conditions and loadings with applications in aircraft, columns with different end conditions with applications in aircraft, Introduction to truss and frames, joints-pin, hinge etc, degrees of freedom for different structures.

TEXT BOOKS:

1. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Company.
2. Engineering Mechanics - Statics and Dynamics by Vijaya Kumar Reddy K , Suresh Kumar J.BS Publications

REFERENCES:

1. Engineering Mechanics / S.S. Bhavikati & K.G. Rajasekharappa
2. A text of Engineering Mechanics / YVD Rao / K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press

4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engineering Mechanics / KL Kumar / Tata McGraw Hill.
6. Engineering Mechanics / Irving Shames / Prentice Hall

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II Year B. Tech, ANE-I Sem

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(R18A2103)ENGINEERING THERMODYNAMICS

Objectives:

- Learn about concepts and laws used in thermodynamics.
- Students acquire knowledge of various cycles.
- Students gain information about the working principle of different engines.

UNIT - I

Introduction: Basic Concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic view points, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle - Reversibility - Quasi - static Process, Irreversible Process, Causes of Irreversibility - Energy in State and in Transition, Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics - Concept of Temperature - First law of Thermodynamics – applied to a process and system, Corollaries , Steady Flow Energy Equation.

UNIT - II

Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase - Energy Equation, Availability and Irreversibility

UNIT - III

Perfect Gas Laws - Equation of State, specific and Universal Gas constants - various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy - Throttling and Free Expansion Processes - Flow processes. Perfect Gas Model, derivations - Vander Waals Equation of State - Compressibility charts - variable specific Heats - Gas Tables - Dryness Fraction - Clausius - Clapeyron Equation Property tables.

UNIT - IV

Mixtures of perfect Gases - Mole Fraction, Mass friction Gravimetric and volumetric Analysis - Dalton's law of partial pressure, Avogadro's Laws of additive volumes - Mole fraction, Volume fraction and partial pressure, Equivalent Gas const. and Molecular Internal Energy. Enthalpy, specific heats. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air.

UNIT - V

Thermodynamic Cycles: Power cycles: Otto, Diesel, Dual Combustion cycles, Lenoir Cycle - Description and representation on P-V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis - comparison of Cycles. Application of Brayton cycles in aviation.

Text Books:

1. Engineering Thermodynamics, Special Edition - MRCET, McGrawHill Publishers-2017
2. Engineering Thermodynamics / PK Nag / TMH, 5th Edition
3. Engineering Thermodynamics / E Rathakrishnan / PHI / Second Edition / 2013

Reference Books:

1. Engineering Thermodynamics / DP Mishra / Cengage Learning / Second impression 2012
2. Thermodynamics - An Engineering Approach - Yunus Cengel & Boles / TMH
3. Thermodynamics - J.P. Holman / McGrawHill
4. Engineering thermodynamics - Jones & Dugan
5. Engineering Thermodynamics / P. Chattopadhyay / Oxford higher Education / Revised First Edition
6. Thermodynamics & Heat Engines - Yadav - Central Book Dept. Allahabad

Outcomes:

- Basic concepts can be applied by the students
- Students can correlate cycles applicable for engines.
- Students should be able to analyze the relationship between various processes and working mechanisms of the engines.

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II Year B. Tech, ANE-I Sem

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(R18A2104) INTRODUCTION TO AERONAUTICAL ENGINEERING

Objective:

1. Insight overview of various important areas in Aeronautical Engineering
2. Students will acquire the knowledge of the Evolution of Aeronautical industry.
3. To provide an exposure of various forces and performance aspects important for flight.

UNIT - I

History of Flight and Airspace Environment

Evolution of flight, usage of balloons, dirigibles, Heavier than air aircraft, various advances in techniques for commercial transportation. Helicopters, missiles, Conquest of space and exploring solar system and beyond, Earth's atmosphere, standard atmosphere, the temperature extremes of space, laws of gravitation low earth orbit, microgravity, benefits of micro gravity. The near earth Radiative environment, magnetosphere, Environmental impact on spacecraft. Meteoroids, micrometeoroids, space debris and the planetary environments.

UNIT - II

Aerodynamics

Airfoil- nomenclature and types, Aerodynamic forces on wings and bodies, Generation of lift, Sources of drag, moment coefficients; numericals, and centre of pressure.

Rotary wing aircraft concepts – Forces while hovering, Propeller Theory.

UNIT - III

Propulsion- Aircrafts, Rockets and Missiles: Thrust for flight, Reciprocating engines-2 stroke/4 stroke; Jet engine and types, Rocket engines - Description, Principles of operation. Types of Missiles, similarities and differences with launch vehicle, controls for missiles, Airframe components of missiles

UNIT – IV

Aircraft Structures: History of airplane construction, Loads on aircraft, aircraft components, Monocoque and semi-monocoque structures, internal structural members and landing gear, wing and fuselage configurations, engine nacelle, empennage configurations.

UNIT – V

Elements of Aircraft Performance and Measurement Techniques:

Drag Polar, Equations of Motion, Thrust Required for level flight, unaccelerated flight, Thrust available and Maximum Velocity, Power required for Level and Unaccelerated flight. Power available and maximum Velocity. Altitude effects on Power required and available.

Sensors and instrumentation- Pitot-static tube, Primary Flight Instruments, Basic principles of Gyro, accelerometers.

TEXT BOOKS:

1. Anderson, J.D., Introduction to Flight, fifth edition, Tata McGraw-Hill, 2007, ISBN: 0-07-006082-4.
2. Kermode, Flight Without Formulae, fifth edition, Pearson Education, 2004, *ISBN*-10: 0273403605; *ISBN*-13: 978-0273403609.
3. V. Ganesan, Gas Turbines, Tata McGraw-Hill, 1999, ISBN, 0070681929

REFERENCES:

1. Turner, M.J.L., Rocket and Spacecraft Propulsion, Springer, 2001.

Outcome:

1. Students acquire knowledge with Aeronautical Engineering to take up study in detail through subsequent courses.
2. Students acquire fundamental concepts of all aspects of flight.
3. Students acquire the knowledge of the important design aspects of aircraft vehicles.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**3**	**-/-/-**	**3**

(R18A2105) AIRCRAFT PRODUCTION TECHNOLOGY

Objectives:

Student can acquire knowledge on various production technologies involved in aircraft manufacturing.

UNIT - I

Casting and Welding Techniques: Various molding process employed in aircraft industry, Types of patterns, Casting Process involved in Sand casting, die-casting, centrifugal casting, investment casting and shell molding. Working Principles and equipment used with emerging trends in arc welding, gas welding, resistance welding, Laser welding, EBM, EDM, Soldering and brazing techniques.

UNIT - II

Machining and Forming: Classification of machining processes, Types of chips, working principles (with schematic diagram only) , types-lathe, shaper, milling machines, grinding (designation of grinding wheel), drilling m/c, CNC machining (overview of G-Codes, M-Codes). Sheet metal operations- shearing, punching, super plastic forming and diffusion bonding. Bending, Automation in bend forming and different operations in bending like stretch forming, spinning, drawing etc.

UNIT - III

Unconventional Machining: Principles of working and applications of abrasive jet machining, ultrasonic machining, electron beam, EDM, and plasma arc machining, Water jet machining, Ion beam machining.

UNIT - IV

Heat Treatment and Surface Finishing: Heat treatment of Aluminum alloys, titanium alloys, steels, case hardening, initial stresses and the stress alleviation procedures. Corrosion prevention, protective treatment for aluminum alloys, steels, anodizing of titanium alloys, organic coating, and thermal spray coatings.

UNIT - V

Jigs & Fixtures: Jigs, fixtures, stages of assembly, types and equipment for riveted joints, bolted joints (only). Aircraft Tooling Concepts.- types of tools used in A/C industry.

NDT and Other Inspection Techniques: comparison of NDT & DT, process involved in Dye Penetrate Test, X-ray, and magnetic particle and ultrasonic testing.

Text Books:

1. "Manufacturing Engineering and Technology" by Kalpajikau - Addison Wesley.

2. "Aircraft production techniques' Keshu S.C, Ganapathy K.K, Interline Publishing House, Bangalore-1993.

Reference Books:

1. "Production technology" - R.K. Jain - Khanna Publishers - 2002.
2. "Production technology" - O.P.Khanna and lal. M.Dhanpat rai publications - New delhi - 1997.

Outcomes:

- The Students can able to use different manufacturing process and use this in industry for component production.
- The student can correlate the various methods of manufacturing employed for different materials.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem	**3**	**-/-/-**	**3**

(R18A2106) AEROSPACE MATERIALS AND COMPOSITES

Objectives:

- To study the types of mechanical behavior of materials for aircraft applications.
- To make the student understand the analysis of composite laminates under different loading Conditions and different environmental conditions.
- To impart the knowledge in usage of composite materials in aircraft component design.

UNIT-I MECHANICAL BEHAVIOUR OF ENGINEERING MATERIALS

Linear and non linear elastic properties – Yielding, strain hardening, fracture, Bauschinger's effect – Notch effect testing and flaw detection of materials and components – creep and fatigue – Comparative study of metals, ceramics, plastics and composites.

UNIT-II HEAT TREATMENT OF METALS AND ALLOYS

Light Metal Alloys: Aluminum and its alloys, high strength and high corrosion alloys. Titanium and its alloys: applications, Classification of steels alloys, effect of alloying elements, magnesium alloys and their properties, maraging steels: properties and applications.

High Strength and Heat Resistant Alloys: Classification of heat resistant materials, iron, nickel and cobalt based alloys, refractory materials, silica based ceramics, properties of inconel, monel, nimonic and super alloys; application of heat resistant alloy in aerospace vehicles. Heat treatment of steel and its alloys. Case hardening, initial residual stresses and stress alleviation procedures, corrosion prevention and protectivetreatments.

UNIT-III INTRODUCTION T O F COMPOSITE M A T E R I A L S

Introduction, polymer matrix composites, metal matrix composites, ceramic matrix composites, carbon-carbon composites, fiber, reinforced composites and nature-made composites and applications.

Reinforcements: Fibers Glass, Silica, Kevlar, carbon, boron, silicon carbide, and born carbide, fibres. Particulate composites, Polymer composites, Thermoplastics, Thermosetting

UNIT-IV Hybrid Composites

Basic design concepts of sandwich construction - Materials used for sandwich construction. Failure modes of sandwich panels. Basic design of composite structure, Smart materials, Functionally Graded Materials (FGM)

Selection criteria for Aerospace Materials: Properties of flight vehicle materials, importance of strength/ weight ratio of materials for aerospace vehicles structures, importance of temperature variations, factors affecting the selection of material for different parts of airplanes.

UNIT-V Application and Testing

Classification of Aircraft Materials used for Aircraft Components-Application of Composite Materials-Super Alloys (Ni & Mg Alloys), Indigenes Alloys (Ti6AL4V, Si-Al-Cu). Emerging Trends in Aerospace Materials (Shape memory alloys). Latest techniques in testing and Flaw Detection of Material and Components by mechanical and NDT checks.

Text Books

1. G. F. Titterton, Aircraft Materials and Processes, 5/e, Sterling Book House,1998.
2. D. Agarwal, L.J. Broutman and K. Chandrasekhara, Analysis and Performance of Fibre Composites, Wiley, 3rd edition, 2015
3. Vijay K.Varadan, K.J.Vinoy, S.Gopalakrishnan, Smart Material Systems and MEMS: Design and Development Methodologies,Wiley

References

1. Martin, J.W., "Engineering Materials, Their properties and Applications", Wykedham Publications (London) Ltd., 1987.
2. G. E. Dieter, Mechanical Metallurgy, 1/e, McGraw Hill, 1976.
3. Nonlinear Approaches in Engineering Applications

Outcomes:

- Exposure to high temperature materials for space applications
- Understanding the mechanics of composite materials
- Knowledge gained in manufacture of composites

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	L	T/P/D	C
II Year B. Tech, ANE-II Sem	-	-/3/-	1.5

(R18A2181)AIRCRAFT PRODUCTION TECHNOLOGY LAB

Objectives:

Basic Exercises in Lathe, Shaper, Milling, Slotting, CNC and Grinding machines welding equipment comprising Microscopes polishing disc grinders as under.

PRODUCTION LAB

1. Plain Turning, Facing, Knurling, Taper turning, Thread Cutting.
2. Drilling, boring, counter boring, counter sinking.
3. Simple exercises on shaping
4. Simple exercises in Planing
5. Plain Milling
6. Gear Milling
7. Sheet metal joining by Soldering.
8. Simple exercises on CNC machines and Programme generation.
9. Simple exercises in Gas.
10. Simple exercises in Arc Welding.
11. Aircraft wood gluing practice
12. Study of properties of sandwich structures

Note: Any 10 experiments can be conducted.

Equipment needed: Lathe, Shaper, Milling, Slotting, EDM, CNC and Grinding machines welding equipment and metallurgy equipment comprising Microscopes polishing disc grinders.

Reference Books:

1. "Aircraft production techniques" Keshu S.C, Ganapathy K.K., Interline Publishing House, Banglore- 1993.
2. "Manfacturing Engineering and Technology" by Kalpakajam - Addison Wesley.

Outcomes:

- Student will have hands on experience on various production techniques.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem			
	0	**3**	**1.5**

(R18A2182)AIRCRAFT ENGINEERING DRAWING LAB

OBJECTIVES:

- T o expose them to existing national standards related to technical drawings.
- It gives all the external and internal details of the machine component from which it can be manufactured. The machining symbols, tolerances, bill of material, etc. are specified on the drawing.
- The knowledge of machine drawing helps in designing the various parts of machine elements. The course content is designed in such a way that the balancing of part drawings (machine components) and assembly drawings of aircraft can be known.

Unit 1

Machine Drawing Conventions: Need for drawing conventions – introduction to IS conventions - Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

Unit 2

Limits and tolerances: Limit System – Tolerances – Fits - Tolerances of Form and Position – Standards followed in Industry

Unit 3

Surface Roughness: Introduction – Surface Roughness – Machining Symbols – Indication of Surface roughness.

Unit 4

Drawing of Machine Elements and simple parts: Selection of Views, additional views for the following machine elements and parts with every drawing proportion:

a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, cotter joints and knuckle joint.
c) Riveted joints for plates

Unit 5

Assembly Drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

a) Engine parts – stuffing boxes, cross heads, Eccentric.
b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.
c) Wing, Landing gear, horizontal stabilizer.

NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts

Outcomes:

On Completion of the course the student will be able to

- An Ability to understand and apply the knowledge of machine drawing as a system of Communication in which ideas are expressed clearly and all information fully conveyed.
- To produce detailed drawings of machines parts from assembly drawing

TEXT BOOK

1. Machine Drawing by K. L. Narayana, P. Kannaiah, K. Venkata Reddy New Age International
2. Raymer, D.P., Aircraft Design: A Conceptual Approach, third edition, AIAA Education Series, AIAA, 1999, ISBN: 1-56347-281-0.

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ANE -I Sem

L	T/P/D	C
2	0	0

(R18A0014)ENVIRONMENTAL SCIENCES (MANDATORY COURSE)

Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I:

Introduction: Definition of Environment and multidisciplinary nature of environmental sciences. **Ecosystems**: Definition, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles (Carbon, Nitrogen, Water cycle) Bioaccumulation and Biomagnification with examples.

UNIT-II:

Natural Resources: Classification of Resources: water resources:types: surface and ground water and over utilization effects of ground water. Dams: benefits and problems. Forest resources: functions, causes and effects of Deforestation, Energy resources: renewable and non-renewable energy sources, use of alternate energy resources.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: **Classification of pollution, Air Pollution**: Primary and secondary pollutants, sources, causes, effects and control measures**Water pollution**: Sources and types of pollution, causes and effects, water treatment methods. **Soil Pollution**: Sources and types, Impacts of modern agriculture. Solid waste management, e-Waste management.

Global Environmental Problems: Green house effect, Global warming, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act1986, Air act 1981, Forest conservation act 1980, Biomedical waste management and handling rules, International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

EIA: EIA structure, methods of baseline data acquisition. Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept, threats and strategies of Sustainable Development, Environmental Education.

SUGGESTED TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.
2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin& Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham& Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of

Ecological principles and environmental regulations which in turn helps in sustainable development

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	L	T/P/D	C
II Year B. Tech, ANE-II Sem	**3**	**-/-/-**	**3**

(R18A2107)AERODYNAMICS

Objectives:

- To introduce the concepts of mass, momentum and energy conservation relating to aerodynamics.
- To make the student understand the concept of vorticity, irrotationality, theory of airfoils and wing sections.
- To introduce the basics of viscous flow.

UNIT I

Basics of Aerodynamics: Aerodynamic forces and Moments, Derivation of Lift, Drag and moment Coefficients with pressure distribution, Variation of pressure distribution with respect to angle of attack, Governing equations of flow- Continuity, momentum and Energy equations in differential form. Flow regimes based on Mach number.

UNIT - II

Inviscid Incompressible Flow over Airfoil: Governing Equation for incompressible and irrotational flow, Elementary flows and their combinations, Magnus effect, D'Alembert's Paradox, Kutta - Joukowsky theorem, kutta condition. Kelvin's circulation theorem & starting vortex, Thin airfoil theory, expressions for calculating the aerodynamic center and Center of pressure.

UNIT – III

Inviscid Incompressible Flow over Wings: Vortex filament statement of Helmholtz's vortex theorems, Biot - Savart Law, horse shoe vortex, Prandtl's Lifting line theorem - downwash and induced drag, Elliptic loading & wings of elliptic planforms, expression for induced drag.

UNIT IV

Applied Aerodynamics: Lift augmentation and Drag Reduction methods - Flaps, slats, slots, winglets, Leading edge root extensions, Large Eddy Breakup device, Co-flow jet, Cuffs and vortex generators. NACA Airfoils, Circulation control, strakes. Drag augmentation methods – spoilers, Air brakes.

UNIT – V

Experimental Aerodynamics

Wind tunnel and its Components, types of wind tunnels and Model testing in wind tunnels. Pressure, Temperature, Velocity measurements – Hotwire and Laser – Doppler anemometer. Force measurements – Wind tunnel balances. Flow visualization techniques-schileren and shadowgraph methods.

Text books:

1. Fundamentals of Aerodynamics, Anderson, Jr., J.D., International edition, McGraw Hill, 2001, ISBN: 0-07-118146-6.
2. Aerodynamics by L.J. Clancy
3. Compressible Aerodynamics, John D. Anderson

Reference Books:

1. Aerodynamics for Engineers, fourth edition, Bertin, J.J., Pearson Education, 2012, ISBN: 81-297-0486-2.
2. Kuchemann, D., The Aerodynamic Design of Aircraft, Pergamon, 1978.
3. Shevell, R.S., Fundamentals of Flight, Indian reprint, Pearson Education, 2004, ISBN: 81-297-0514-1.
4. McCormick, B.W., Aerodynamics, Aeronautics & Flight Mechanics second edition John Wiley, 1995, ISBN: 0-471-575062.

Outcomes:

- An ability to apply thin airfoil theory to predict aerodynamic characteristics of air foil
- Application of Elementary flows to develop real problems.
- Development of devices to enhance aerodynamic characteristics of aircraft components.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A2108) MECHANICS OF SOLIDS

Unit – I

Analysis of stress- Introduction to Solid Mechanics – Basic Concepts, Types of Stress, General State of Stress at a Point, State of stress at a point, Complimentary Shear stresses, Stresses on Oblique planes, Materials Subjected to pure shear, Material subjected to two mutually perpendicular direct stresses, Material subjected to combined direct and shear stresses, Principal plane inclination in terms of associated principal stress, graphical solution – mohr's stress circle.

Unit – II

Members Subjected to Flexural Loads: Geometric Forms of beams, Classifications of beams, statistically determinate and Indeterminate Beams, Concept of Shear Force and bending moment in beams, Basic Relationship between the Rate of Loading, Shear Force and Bending Moment Diagrams, Simple Bending theory and Derivation of flexural equation.

Unit – III

Shear Stress Distribution: rectangular section, I section, Circular Cross Section

Deflection of beams: for a simply supported and Cantilever beam with problems using Double Integration method and Macaulay's method. Concept of overhanging, fixed and Continuous beams.

Unit – IV

Elastic stability of Columns: Theories of Elastic Failure**,** Euler's theory, Critical load determination of columns with different end constraints, Rankine and Johnson Formulae. Concepts of beam- column buckling.

Unit – V

Theories of failures: Von-mises theory, octahedral shears distortion energy theory, Maximum principle elastic strain theory, Maximum principle shear strain theory, Maximum shear stress theory.

TEXT BOOKS:

1. Strength of Materials by S Ramamrutam, Dhanpat Rai Publications
2. Aircraft Structures for Engineering Students by THG Megson, Elsevier Aerospace Engineering Series.

REFERENCES:

1. Strength of Materials by R S Khurmi, S Chand and company Ltd

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	L	T/P/D	C
II Year B. Tech, ANE-II Sem			
	3	**-/-/-**	**3**

(R18A2109)AIR BREATHING PROPULSION

Objective:

- Students can focus on various propulsion systems available in aerospace industry and also understand the future scenario.
- Understand the performance aspects at the design point and off design operations.
- To provide an exposure with reference to numerical calculations and design limitations.

UNIT I

FUNDAMENTALS OF PROPULSION: Aircraft Engine components- performance requirements, thermodynamic processes- change of state- representation by T-s and p-v diagrams - pressure ratios, temperature ratios. Energy transfer, losses- entropy generation- mechanisms. Performance- polytropic, stage and component efficiencies, burning efficiency Station numbering in engine, thrust generation, equation of thrust for installed and uninstalled cases, factors affecting thrust, Role of propulsion in aircraft performance.

UNIT II

ANATOMY OF JET ENGINE-I

INLETS: Locations, Types of inlets, operating principle, functions, geometry, operating conditions, flow field, capture area, sizing, flow distortion, drag, and diffuser losses and methods of mitigation, performance.

NOZZLE: Exhaust nozzles- primary nozzle, thrust reversal, vectoring mechanisms. Afterburner functions and its components, design requirements and parameters. Gross thrust coefficient, discharge, coefficient, velocity coefficient, angularity coefficient, Numericals on nozzles.

UNIT III ANATOMY OF JET ENGINE-II COMPRESSOR & TURBINE: Types, construction, stage, cascade, blade geometry, velocity triangles, Euler equation, types of flow analysis, diffusion factor, stage loading, Variable stator, Numericals on turbo machinery, Axial flow turbines-, similarities and differences with compressors, Velocity diagram analysis, no exit swirl condition, flow losses, causes tangential stresses, repeating stages, Typical turbine blade profiles, turbine performance maps, Thermal limits of blades, cooling, materials, multistage, multi-spooled turbines.

UNIT IV

ANATOMY OF JET ENGINE-III BURNER: Burners- types, components- function, schematic diagram, airflow distribution, cooling- types, cooling effectiveness, performance parameters - effect of combustor design, Fuel injection, atomization, vaporization, recirculation- flame stabilization, flame holders. Afterburners, fuels - composition.

UNIT V:

DESIGN OF GAS TURBINE ENGINE: Aircraft Mission Analysis, Engine Selection- Performance and Parametric Analysis, Sizing the Engine, Major Considerations in Engine Components Design.

SYSTEM MATCHING AND ANALYSIS: Matching of Gas Turbine Components, Cycle Analysis of one and two spool engines, Gas Generator, Component Modeling, Matching of Engine and Aircraft.

Text Books:

1. Mattingly, J.D., Elements of Gas Turbine Propulsion, McGraw-Hill, 1996, ISBN0-07- 912196-9.

2. Flack, R.D., Fundamentals of Jet Propulsion with applications, Cambridge University Press, 2005, ISBN0-521-81983-0.

References:

1. Cohen, Henry, Rogers, G. F. C., Saravanamuttoo, H.H., Gas Turbine Theory, Longman Pub Group, ISBN 10: 0582236320 ISBN 13: 9780582236325.

2. V. Ganesan, Gas Turbines, Tata McGraw-Hill, 1999, ISBN, 0070681929.

Outcomes:

- Students attain knowledge of all propulsion systems in use and under developed.
- Students will be able to configure the engine required for specific need.
- Students understand design requirements of engine and aircraft.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
II Year B. Tech, ANE-II Sem			
	3	**-/-/-**	**3**

(R18A2110) AIRCRAFT PERFORMANCE

OBJECTIVES OF THE COURSE:

- **To equip the students with fundamental understanding of aircraft performance in various flight regimes.**
- **To familiarize the concepts and parameters affecting flight performance.**

UNIT – I: INTRODUCTION TO AIRCRAFT PERFORMANCE- THE FORCE SYSTEMS OF THE AIRCRAFT:
The role and design mission of an aircraft. Specification of the performance requirements and mission profile. Importance of performance analysis, estimation, measurement, operational safety and economy. The Standard Atmosphere. Off-standard and design atmosphere. Measurement of air data. Air data computers. Equations of motion for performance - the aircraft force system. The propulsive forces - the thrust production engines, power producing engines, variation of thrust, propulsive power and specific fuel consumption with altitude and flight speed.

UNIT – II: CRUISE PERFORMANCE:
Maximum and minimum speeds in level flight. Range and endurance with thrust production, and power producing engines. Cruise techniques - constant angle of attack, constant Mach number; constant altitude, methods- comparison of performance. The effect of alternative fuel flow laws, weight, altitude and temperature on cruise performance. Cruise performance with mixed power-plants.

UNIT – III: CLIMB & DESCENT PERFORMANCE:
Climb and descent techniques, safety considerations, performance analysis- maximum climb gradient, climb rate. Energy height and specific excess power, optimal climbs - minimum time, minimum fuel climbs. Measurement of climb performance. Descent performance in aircraft operations. Effect of wind on climb and descent performance.

UNIT – IV: MANEUVER PERFORMANCE:
Accelerated motion of aircraft - equations of motion- the maneuver envelope. Longitudinal maneuvers- the pull-up, push over maneuvers. Lateral maneuvers- turn performance- turn rates, turn radius- limiting factors. Maneuver boundaries, Maneuver performance of military aircraft, transport aircraft.

UNIT-V: TAKE-OFF AND LANDING- SAFETY REQUIREMENTS - FLIGHT PLANNING:
Estimation of take-off distances. The effect on the take-off distance with respect to weight, wind, runway conditions, ground effect. Take off safety factors. The estimation of landing distances, the discontinued landing, baulked landing, air safety procedures and requirements on performance. The effect on the landing distance, of weight, wind, runway conditions, ground effect. Fuel planning, fuel requirement, trip fuel, reserve and tankering.

TEXT BOOKS:

Eshelby, M.E., Aircraft Performance; Theory and Practice, AIAA Education Series, AIAA, 2000, ISBN: 1-56347-398-4.

REFERENCE BOOKS:

1. Raymer, D.P., Aircraft Design: A Conceptual Approach, third edition, AIAA Education Series, AIAA, 1999, ISBN: 1-56347-281-0.
2. Yechout, T.R. et al., Introduction to Aircraft Flight Mechanics, AIAA Education Series, AIAA, 2003, ISBN: 1-56347-577-4.

Outcomes:

1. The student will have a clear understanding of the fundamental concept leading to aircraft performance including military and passenger aircraft.

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
II Year B. Tech, ANE-II Sem			
	3	**-/-/-**	**3**

(R18A0024)PROBABILITY AND STATISTICS

Objectives:

1. To understand a random variable that describes randomness or an uncertainty in certain realistic situations which can be either discrete or continuous type.
2. To learn functions of multiple random variables through joint distributions since the random situations are described as functions of multiple random variables.
3. To learn some of the important probability distributions like Binomial, Poisson Distributions (discrete case) and the Normal Distribution (continuous case).
4. To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
5. To make inferences about a population from sample data(large and small samples) using probability theory.

UNIT – I: Random Variables

Single and multiple random variables -discrete and continuous. Probability distribution function, mass function and density function of probability distributions.Mathematical expectation and variance.

UNIT-II: Probability distributions

Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and normal distribution – properties, mean and variance.

UNIT -III: Correlation and Regression

Correlation -coefficient of correlation, rank correlation. Regression-regression coefficients, lines of regression.

UNIT –IV: Sampling

Sampling: Definitions of population, sampling, statistic, parameter - types of sampling - expected values of sample mean and variance, standard error - sampling distribution of means and variance. Estimation - point estimation and interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, critical region - confidence interval - Level of significance, one tailed and two tailed test.

Unit-V: Statistical Inferences

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, and difference of proportions.
Small samples: Test for single mean, difference of means, test for ratio of variances (F-test) - Chi-square test for goodness of fit and independence of attributes.

TEXT BOOKS:

i. Fundamental of Statistics by S.C. Gupta, Himalaya Publishing House.
ii. Fundamentals of Mathematical Statistics by SC Gupta and V.K. Kapoor, Sultan Chand Publishers.
iii. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

i. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press.
ii. Probability and Statistics by Dr.T.K.V Iyengar , B.KrishnaGandhi ,S. Ranganatham & M V S S A N Prasad. S Chand Publishers.

Course Outcomes: After learning the contents of this paper the student will be able to

- Describe randomness in certain realistic situation which can be either discrete or continuous type.
- Provide very good insight which is essential for industrial applications by learning probability distributions.
- Make data-driven decisions by using correlation and regression.
- Understand the importance of sampling distribution of a given statistic of a random sample.
- *Draw statistical inference* using samples of a given size which is taken from a population and to apply statistical methods for analyzing experimental data.

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	L	T/P/D	C
II Year B. Tech, ANE-I Sem			
	-	**-/3/-**	**1.5**

(R18A0391) MECHANICS OF SOLIDS AND MECHANICS OF FLUIDS LAB

Objectives:

- To supplement the theoretical knowledge gained in Mechanics of Solids with practical testing for determining the strength of materials under externally applied loads.
- This would enable the student to have a clear understanding of the design for strength and stiffness**.**
- Upon Completion of this subject, the students can able to have hands on experience in flow measurements using different devices

(A) MECHANICS OF SOLIDS LAB:

1. Direct tension test
2. Torsion test
3. Hardness test
   a) Brinells hardness test
   b) Rockwell hardness test
4. Test on springs
5. Compression test on cube
6. Impact test
7. Punch shear test

(B) MECHANICS OF FLUIDS LAB

8. Calibration of Venturimeter
9. Calibration of orifice meter
10. Verification of Bernoulli's apparatus.
11. Pipe friction.
12. Determination of co-efficient of loss of head in a sudden retraction (Mouth Piece Apparatus)

Note: Any 10 experiments can be conducted minimum five from each section.

Equipment needed

MOS – lab

1. UTM – 20 / 40 Tons with load Vs Elongation graphical attachment and provision for Bending and sheering along with accessories and end grips
2. Deflection test rig (Fabricated hardware + precession dial gauge)
3. Torsion testing Machine
4. Hardness testing Machine (Brinnel and Rockwell)
5. Impact Testing Machine
6. Spring testing Machine.

MOF – lab

1 Venturimeter test rig
2.Test rig for Flow over notch
3.Pipe friction apparatus
4.Bernoulli's apparatus
5.test rig for Orifice meter
6. Mouthpiece apparatus.

Outcomes:

- Ability to characteristic materials
- Ability to use the measurement equipments for flow measurement

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ANE-II Sem

L	T/P/D	C
-	-/3/-	1.5

(R18A0392) CADLAB

LIST OF EXPERIMENT:

1. INTRODUCTION to CAD and AutoCAD – BASICS
2. 2D – FIGURES for practice USING AutoCAD
3. ISOMETRIC DRAWING for practice USING AutoCAD
4. INTRODUCTION TO CREO 3.0
5. 3-D FIGURES USING CREO
6. Modeling of Knuckle Joint
7. Modeling of Piston Cylinder Assembly
8. Modeling of stuffing box
9. Modeling of wing
10. Modeling of Fuselage
11. Modeling of Empennage
12. Assembling of Landing Gear

Software: AUTOCAD 2013 and CREO – 3.0

REFERENCES:

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ANE-II Sem

L	T/P/D	C
2	0	0

(R18A0004)FOREIGN LANGUAGE: FRENCH
(Mandatory Course)

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

OBJECTIVES

1. To inculcate the basic knowledge of the French language.
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation.
3. To culminate their major with evidence of a purposeful education.

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his admirations and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend
Grammar: The expression of time – The –ir verbs in the present - The verbs do, go, take, come, - Adverbs - Reflexive verbs
Vocabulary: The days and months of the year - The sports – Hobbies

UNIT - IV
Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops
Writing: A dialogue between a vendor and a customer at the market
Grammar: Verbs "to want", "to can" - Express capacity / possibility - Express will / desire – the future tense
Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V
Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement
Writing: Descriptions
Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present
Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

OUTCOMES

1. The students will be able to communicate in French at A1 level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

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II Year B. Tech, ANE-I Sem	**L**	**T/P/D**	**C**
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(R18A0005)FOREIGN LANGUAGES: GERMAN
(Mandatory Course)

INTRODUCTION

This is the age of globalization. Faster communication, extensive travel, greater interaction, outsourcing of jobs, demand of skilled person had made the engineering graduates to learn GERMAN language. Nowadays Aircraft and mechanical domain require more and more graduates with minimum knowledge to speak in German language

German language has been one of the fastest learning language in the world. This course is customized according to the demand of the requirement in job industries.

OBJECTIVES:

1. To equip with the vocabulary to create new sentences, sentence pattern, correct pronunciation.
2. To make the students an efficient German language speaker.
3. To focus on basic linguistic and communicative structures of the German language.

SYLLABUS

UNIT 1 : Basics of Deutsch

Introduction – (About German Country, Language & Culture)
Formal And Informal Greetings
Alphabet
Numbers (0-50)
Days Of The Week And Months Of The Year
Vocabulary, Exercises and Assignments

UNIT 2 : Getting closer with Deutsch

Family
Seasons & Weather
Time & Directions, Days Of Weak, Months
Colours & Shapes, Numbers (51 – 100)
Subject Pronouns
Vocabulary, Exercises and Assignments

Unit 3 : **Construction of Simple Sentences**

Formal Introduction
Asking Questions
Responding to the Questions
Simple Sentences
Articles, Numbers (101 And Above)
Vocabulary, Exercises and Assignments

Unit 4 : **Dialogue Writing**

Introduce Oneself
Introduce Others
At the Restaurant
At the Railway Station
At the University
Vocabulary, Exercises and Assignments

REFERENCE BOOKS

6. Collins easy learning GERMAN dictionary
7. Hallo deutsch – Parul sharma
8. Studio D A1 – Hermann
9. So geht das – New Saraswati book house
10. Practice German language for beginners – Dominic
11. German Made easy – Diego Agundez

OUTCOMES

Student will be able to:

1. stand ahead of getting the opportunity in the Job market by learning German language.
2. learn German language with engineering degree that will give them a sense of identity among the competitive global engineering industry.
3. learn German language on a regular basis that will help them in improving multi-lingual ability.

OPEN ELECTIVE - I

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II Year B.Tech II Sem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE - I
(R18A0451) DIGITAL ELECTRONICS

OBJECTIVES:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,

AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

OUTCOMES

After the completion of the course, the student will be able to:

1. Analyse different methods used for simplification of Boolean expressions
2. Design and implement Combinational and Sequential circuits.
3. Design and implement Synchronous and Asynchronous Sequential Circuits.

TEXT BOOK:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCES:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc,2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

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II Year B.Tech II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE - I

(R18A0551) DATABASE SYSTEMS

OBJECTIVES

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations- Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition , 2010.

2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, “Database Management System”, McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,”Fundamentals of Database System,” Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, “An Introduction to Database”, Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, “Database Systems – Design, Implementation, and Management”, 9th Edition, Thomson Learning, 2009.

OUTCOMES

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

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	3	-/-/-	3

OPEN ELECTIVE I

(R18A0553) DATA STRUCTURES USING PYTHON

COURSE OBJECTIVES:

1) Exploring basic data structures such as stacks and queues.
2) Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.
3) Introduces sorting algorithms

UNIT - I

Introduction to Data Structures: Data types, data structures basics, abstract data types, the running time of a program, the running time and storage cost of algorithms, complexity, asymptotic complexity, big O notation, obtaining the complexity of an algorithm.

Searching- Linear Search, Binary Search.

Sorting-Insertion Sort, Selection Sort, bubble sort, Quick sort, Merge sort, Comparison of Sorting methods.

UNIT - II

Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations, queue applications

UNIT – III

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash table representation: hash functions, collision resolution-separate chaining, open addressing- linear probing, quadratic probing, double hashing, and rehashing, extendible hashing.

UNIT - IV

Graphs – Introduction, Definition, Terminology, Graph Representations-Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS. Trees – Terminology, Representation of Trees, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals.

UNIT - V

Priority Queue ,Different Types , Heap-Definition, types, insertion and Deletion operation on heaps. Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion. AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching.

TEXTBOOKS

1. Fundamentals of data structures in C, 2 nd edition, E.Horowitz, S.Sahni and Susan Anderson Freed, Universities Press.
2. Data structures using c – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES

1. Data structures: A Pseudo code Approach with C, 2 nd edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning.
2. Introduction to data structures in c, 1/e Ashok Kamthane.

COURSE OUTCOMES:

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or Combinations.
3. Implement and know the application of algorithms for sorting.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, heaps, graphs, and AVL-trees.

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II Year B.Tech II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE - I

(R18A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. The objective of this course is to provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.

Unit-I

Introduction: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

Unit-II

Parties to IP Rights: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

Unit-III

Ensuring the value of IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

Unit-IV

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

Unit-V

Remedies and IPR Evaluation - GATT - WTO - Role of WTO in solving IPR issues.

REFERENCES:

- A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
- Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
- Intellectual Property Rights: N K Acharya: ISBN: 9381849309
- Intellectual Property Rights: C B Raju : ISBN-8183870341
- Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
- Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

COURSE OUTCOMES

1. It allows students how to prepare and protect the Inventions , start up ideas and rights of patents and copy rights etc.,
2. This subject brings awareness to the students the basic legal aspects at present following at Global level.

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II Year B.Tech II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE - I

(R18A0352) GREEN ENERGY SYSTEMS

COURSE OBJECTIVES:

1. The course aims to highlight the significance of alternative sources of energy.
2. Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

UNIT-I

Introduction:

Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion –
types of PV cells, I-V characteristics.

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

Solar Energy Storage And Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels,
I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants,thermodynamic cycles.
Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

Energy Efficient Systems: (A) Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning),
demand site management.

(B) Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Green Buildings: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy

COURSE OUTCOMES:

1. The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
2. Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.

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3	-/-/-	3

OPEN ELECTIVE – I

(R18A0555) DATA VISUALIZATION

Course Objectives:

- To learn different statistical methods for Data visualization.
- To understand the basics of R and Python.
- To learn usage of Watson studio.
- To understand the usage of the packages like Numpy, pandas and matplotlib.
- To know the functionalities and usages of Seaborn.

UNIT I

Introduction to Statistics : Introduction to Statistics, Difference between inferential statistics and descriptive statistics, Inferential Statistics- Drawing Inferences fromData, Random Variables, Normal Probability Distribution, Sampling, Sample Statistics and Sampling Distributions.

R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

UNIT II

Data manipulation with R: Data manipulation packages-dplyr, data.table, reshape2, tidyr, Lubridate, Data visualization with R.

Data visualization in Watson Studio: Adding data to datarefinery, Visualization of Data on WatsonStudio.

UNIT III

Python: Introduction toPython, How toInstall, Introduction to JupyterNotebook, Python scripting basics, Numpy and Pandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and date time columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools in Python- Introduction to Matplotlib, Basic plots using matplotlib, Specialized Visualization Tools usingMatplotlib, Advanced Visualization Tools using Matplotlib-Waffle Charts, Word Clouds.

UNIT V

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.
2. Hands on programming with R by Garrett Grolemund,Shroff/O'Reilly; First edition
3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress
2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc. \
3. The Comprehensive R Archive Network- https://cran.r-project.org
4. https://seaborn.pydata.org/
5. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization.
- Gain knowledge on R and Python
- Understand usage of various packages in R and Python.
- Demonstrate knowledge of Watson studio.
- Apply data visualization tools on various data sets

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III Year B.Tech ANE-I Sem	L	T/P/D	C
	3	-/-/-	3

(R18A2111) AIRCRAFT VEHICLE STRUCTURES

Objectives:

- To impart basic understanding aircraft structure
- To provide the students an understanding on the linear static analysis of determinate and Indeterminate aircraft structural components.
- To provide the design process using different failure theories.

UNIT –I

THEORY OF THIN PLATES AND THIN WALLED BEAMS

Analysis of thin rectangular plates subject to bending, twisting, distributed transverse load, combined bending and in-plane loading - Wagner beam analysis.

UNIT –II

UNSYMMETRICAL BENDING AND IDEALIZATION

Unsymmetrical bending-resolution of bending moments - direct stress distribution, shear centre, twist, Bredth - Batho shear flow - Structural idealization of different aircraft components.

UNIT –III

ENERGY METHODS

Principle of virtual work and virtual displacement - Strain Energy in axial, bending, torsion and shear loadings - Castigliano's theorems, unit load methods – Maxwell reciprocal theorem, principle of superposition.

UNIT-IV

STRUCTURAL AND LOADING DISCONTINUITIES IN THIN WALLED BEAMS

Closed section beams-shear stress distribution of a closed section beam built in at one end under bending, shear and torsion loads. Open section beams-I Section beam Subjected to torsion.

UNIT- V

Stress Analysis of Aircraft Components- Wing, Fuselage:

Wing spars and box beams-tapered wing spar, open and closed section beams. Bending, shear, torsion, cut-outs in fuselages, fuselage frames and wing ribs.

Text Books:

1. Strength of materials by R.S.Khurmi.
2. Strength of materials by Hibler.

3. Aircraft structures for engineering students by T H G Megson

Reference Books:

1. David J. Peery "Aircraft Structures" McGraw Hill Book Company.
2. Argyris J.H. and Kelsey S.Energy theorems and structural analysis, Butterworths Scientific Publications 1960.

Outcomes:

- The student will be able to analyze basic aircraft structure.
- Analyzing determinant and indeterminate structures.
- Application of Energy principles

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III Year B.Tech ANE-I Sem	L	T/P/D	C
	3	-/-/-	3

(R18A2112) AIRCRAFT STABILITY AND CONTROL

Objectives:

1. To understand the concepts of stability and control of aircraft.
2. To familiarize with various Aircraft motions and related stability
3. Analyze the different type of modes in longitudinal, lateral and directional motion of aircraft, and recovery from those modes.
4. Understand Method of mathematical modeling of physical systems
5. Review Performance analysis and design of aircraft control system

UNIT –I: Stability, Control Requirements &Static Longitudinal Stability and Control: Degree of freedom of a system -Static and dynamic stability -Purpose of controls -Inherently and marginally stable airplanes. **Stick Fixed**-Basic equilibrium equation-stability criterion-contribution of wing, tail, fuselage-the most aft center of gravity, Power effects-elevator power, stick fixed neutral point-**stick free stability**-Hinge moment coefficient-stick free neutral points- maneuvers-stick force gradients-stick force per'g'-Aerodynamic balancing.

UNIT –II: **Aircraft Equations of motion- Perturbed Motion- Linearized, Decoupled Equations**:

Aircraft Equations of Motion (EOM), Aircraft Position and Orientation, Stability-Frame and Body-Frame, Euler's Equations, Small Disturbance Theory and Linearization of EOM, Decoupling into longitudinal and lateral-directional motions- conditions for validity- role of symmetry.

UNIT –III: **Lateral ,Directional & Dynamic Stability-Response To Control**: Lateral and directional stability-definition, static directional stability rudder fixed , directional control, stick – free directional stability, dihedral effect and lateral control, estimation of airplane dihedral effect, lateral control introduction ,estimation of lateral control power, Adverse yaw , aileron control forces.
Solutions to the stability quartic of the linearized equations of motion, the principal mode-phugoid, short period, Dutch roll and spiral modes-further approximations, restricted degrees of motion-solutions, response to controls, auto rotation and spin.

UNIT –IV: **Control System Modeling and Feedback Control**

Basic components of control system, open loop system, closed loop system, Types. Reduction of block diagrams - rules and conventions. Stability analysis- Routh Hurwitz, Bode Plot, Polar plot, - determination of gain margin and phase margin.

UNIT-V: Design of Aircraft Controller, Stability and Control Augmentation & Auto Pilots

Design of Stability Augmentation System (SAS) using displacement & rate feed-back, Control augmentation system, Full authority fly-by-wire control, need for automatic control. Auto pilots-purpose, functioning, displacement auto pilot, pitch, yaw, bank, altitude and velocity hold auto pilot.

Text Books:

1. Yechout, T. R. et al., Introduction to Aircraft Flight Mechanics, AIAA education Series, 2003, ISBN 1-56347-577-4.
2. Airplane performance stability and control by Courtland D.Perkins ,Robert E.Hage John wiley& sons.

Reference Books:

1. Etkin, B. and Reid, L. D., Dynamics of Flight, 3rd Edition. John Wiley, 1998, ISBN 0-47103418-5.
2. Schmidt, L. V., Introduction to Aircraft Flight Dynamics, AIAA Education Series, 1998, ISBN A-56347-226-0.
3. McCormick, B. W., Aerodynamics, Aeronautics and Flight Mechanics, 2nd Edition., Wiley India, 1995, ISBN 978-]
4. Nelson, R. C., Flight Stability and Automatic Control, 2nd Edition., Tata Mc Graw Hill, 2007, ISBN 0-07-066110-3.

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III Year B.Tech ANE-I Sem	L	T/P/D	C
	3	-/-/-	3

(R18A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

OBJECTIVES:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

OUTCOMES:

Students should be able

- To understand the basic economic principles, forecast demand and supply
- To estimate cost and understand market structure, pricing practices
- To interpret the financial results of the organisation.

Unit-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.

Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

Unit-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing; Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

Unit-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

References:

- Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017 D.N. Dwivedi, Managerial Economics, Vikas Publications.
- Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
- P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
- S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
- M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

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III Year B.Tech ANE-I Sem

L	T/P/D	C
3	-/-/-	3

(R18A2113) HIGH SPEED AERODYNAMICS

Objectives:

- Study the basic governing equations of compressible flows and its parameters.
- Study the effects of Shock and Expansion waves on aerodynamic characteristics.
- Learn about the experimental methods to study about compressible flows.

Tables: Isentropic, Normal Shock, Oblique Shock, Prandtl Meyer function.

UNIT-I ONE DIMENSIONAL COMPRESSIBLE FLOWS

Review of Thermodynamics. Definition of Compressibility, Stagnation conditions, Speed of sound, Mach number, shock waves. One dimensional flow governing equations. Alternative forms of Energy equations, Normal shock relations with numerical.

UNIT-II OBLIQUE SHOCK AND EXPANSION WAVES

Oblique shock waves. Supersonic flow over a wedge Θ - β - M relations strong and weak shock solutions, regular reflection from a solid boundary. Expansion waves, Prandtl – Meyer Expansion. Shock Expansion theory.

UNIT-III

SUBSONIC COMPRESSIBLE FLOW OVER AIRFOIL

Introduction - Velocity potential equation –small perturbation equation - Prandtl-Glauert compressibility corrections - Critical Mach number with numericals - Drag divergence Mach number - Area rule - Supercritical airfoil.

UNIT – IV

LINEARIZED SUPERSONIC FLOWS AND HYPERSONIC FLOWS

Linearized supersonic pressure coefficient, application to airfoils, lift and drag for flat plate, comparision with shock expansion theory.

Qualitative aspects of hypersonic flows, Newtonian theory, modified Newtonian theory, lift and drag.

UNIT- V

FLOW THROUGH NOZZLES AND VARIABLE AREA DUCTS

Quasi one dimensional flow, Area-velocity relation, Isentropic flow through Convergent – Divergent nozzles. Choked flow conditions. Under and Over expansion conditions. Flow through diffusers – wave reflections from a free boundary. Application to supersonic wind tunnel.

Text Books:

1. Anderson, J .D., Fundamental of Aerodynamics, Mc Graw-Hill International third edition Singapore-2001.

Reference Books:

1. Radhakrishnan, E, E., Gas Dynamics, Prentice Hall of India, 1995.
2. Anderson, J .D., Modern Compressible Flow with Historical Perspective, Mc Graw-Hill International third edition Singapore-2004.

Outcomes:

- Understand the compressible flow parameters shock and expansion wave effecting flow behavior.
- Able to design nozzle, diffuser and variable area ducts to obtain required aerodynamic outputs.
- Able to understand hypersonic flows.

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III Year B. Tech, ANE-I Sem

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(R18A2131)INTRODUCTION TO SPACE TECHNOLOGY

(PROFESSIONAL ELECTIVE – I)

Objectives:

- Students acquire knowledge about the present space technology.
- Students can focus on various orbits, re-entry paths, and also understand the future scenario.
- To provide an exposure with attitude requirements and design limitations.

UNIT - I

Fundamentals of Rocket Propulsion: Space Mission-Types based on Space Environment, vehicle selection. Rocket propulsion-Types, Rocket equation, chemical rocket propulsion, solid propellant rocket motor, liquid propellant rocket engine,

Two-dimensional trajectories of rockets and missiles-Multi-stage rockets-Vehicle sizing-Two stage Multi-stage Rockets-Trade-off Ratios-Single Stage to Orbit-Sounding Rocket-Aerospace Plane-Gravity Turn Trajectories-Impact point calculation-injection conditions-Flight dispersions.

UNIT - II

Atmospheric Reentry: Introduction-Steep Ballistic Reentry-Ballistic Orbital Reentry-Skip Reentry-"Double-Dip" Reentry - Aero-braking - Lifting Body Reentry.

UNIT - III

Fundamentals of Orbit Mechanics, Orbit Maneuvers: Two-body motion-Circular, elliptic, hyperbolic, and parabolic orbits-Basic Orbital Elements-Ground trace In-Plane Orbit changes-Hohmann Transfer-Bielliptical Transfer-Plane Changes - Combined Maneuvers - Propulsion for Maneuvers.

UNIT - IV

Satellite Attitude Dynamics: Torque free axi-symmetric rigid body-Attitude Control for Spinning Spacecraft - Attitude Control for Non-spinning Spacecraft - The Yo-Yo Mechanism - Gravity - Gradient Satellite-Dual Spin Spacecraft- Attitude Determination.

UNIT - V

Space Mission Operations: Supporting Ground Systems Architecture and Team interfaces - Mission phases and Core operations - Team Responsibilities - Mission Diversity - Standard Operations Practices.

Text Books:

1. "Spaceflight Dynamics", W.E. Wiesel, McGraw Hill, 1997.

2. "Rocket Propulsion and Space flight dynamics", Cornelisse, Schoyer HFR and Wakker KF, Pitman, 1984.

Reference Books:

1. Vincet L. Pisacane, "Fundamentals of Space Systems", Oxford University Press, 2005.
2. "Understanding Space: An Introduction to Astronautics", J.Sellers, McGraw Hill, 2000.
3. "Introduction to Space Flight", Francis J Hale, Prentice-Hall, 1994.
4. "Spacecraft Mission Design", Charies D.Brown, AIAA education Series, 1998.
5. "Elements of Space Technology for aerospace Engineers", Meyer Rudolph X, Academic Press, 1999.

Outcomes:

- Students can correlate with the different orbits and mechanics available.
- Students can obtain knowledge of space mission operations.
- Students can able to design the conceptual requirements.

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III Year B.Tech ANE-I Sem	L	T/P/D	C
	3	-/-/-	3

(R18A2132) MECHANISMS AND MACHINE DESIGN
PROFESSIONAL ELECTIVE – I

Objectives:

- The subject gives in depth knowledge on general mechanisms and mechanical design of which aircraft systems are important component.

UNIT – I

Mechanisms: Elements of links: Classification, Types of kinematic pairs: Lower and higher pairs, closed and open pairs. Constrained motion. Kinematic chain, inversions of mechanisms: inversion of quadratic cycle. Chain – single and double slider crank chains.

UNIT – II

Kinematic Analysis and Design of Mechanisms:

Kinematic analysis: Velocity and acceleration. Motion of link in machine determination of velocity and acceleration diagrams – graphical method. Application of relative velocity method for four bar chain. Analysis of slider crank chain for displacement, velocity and acceleration of sliding- Acceleration diagram for a given mechanism, Klein's construction, Coriolis acceleration, Determination of Coriolis component of acceleration.

Instantaneous centre of rotation, centrode and axode – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT – III

Gyroscope – Processional Motion: The gyroscope – free and restrained – working principle – the free gyro, rate gyro, integrating gyro as motion measuring instruments. Effect of precession on the stability of vehicles – motorbikes, automobiles, airplanes and ships, Static and dynamic forces generated due to in precession in rotating mechanisms.

UNIT – IV

CAMS and Followers: Cams and followers – definition, uses – types – terminology. Types of follower motion – uniform velocity, simple harmonic motion and uniform acceleration. Maximum velocity and acceleration during outward and return strokes.

UNIT – V

Gears and Gear Trains: Introduction to gears – types , law of gearing. Tooth profiles – specifications, classification – helical, bevel and worm gears, simple and reverted gear train, epicyclic gear trains – velocity ratio or train value.

Belts & Ropes: Types of belts, Velocity Ratio of belt drive, Slip of belt, Creep of belt, Length of open belt drive, length of cross belt drive, Power transmitted, Angle of contact, Centrifugal tension, Condition for transmission of maximum power, V-belt drives, Rope drives, Ratio of driving tensions for rope drives.

Text Books:

1. The Theory of machines – Thomas Beven., Third Edition – Pearson Publishers.
2. Theory of machines and Mechaisms Third Edition – John J. Uicker, Jr. Gordon R. Pennock, Josph E. Shigley, Oxford Publisher.
3. Theory of Machines - J.K. Gupta and R.S. Khurmi – S Chand Publications

Reference Books:

1. Mechanism and Machine Theory – J. S Rao, R.V.D Dukkipati, New age Publishers.
2. Theory of Machines, - III rd Edition Sadhu Singh, Pearson Publishers.

Outcomes:

- Application of principles in the formation of mechanisms and their kinematics.
- *Able to understand the effect of friction in different machine elements.*
- Can analyze the forces and toques acting on simple mechanical systems

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III Year B.Tech ANE-I Sem

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(R18A2133) WIND TUNNEL TECHNIQUES

PROFESSIONAL ELECTIVE – I

UNIT- I AERODYNAMIC EXPERIMENTS- HISTORY, MODEL TESTNG Forms of aerodynamic experiments- Model testing- wind tunnel- principles-scaling laws, scale parameters- significance. low speed wind tunnels - types, description. High speed tunnels- transonic, supersonic, hypersonic, shock tubes, special tunnels- low turbulence, high Re, environmental, automobile- function, distinctive features, application. Major wind tunnel facilities- description, details.

UNIT- II LOW SPEED WIND TUNNELS- CONSTRUCTION, COMPONENTS, PERFORMANCE Low speed wind tunnel- principal components- working section, diffuser, corners, turning vanes, fan, straighteners, honeycombs, screens, contraction cone, fan, motor- function, description, design requirements, constraints, construction, performance- loss coefficients. Wind tunnel performance- flow quality, power losses.

UNIT- III WIND TUNNEL CORRECTIONS & LOAD MEASUREMENTS Wind tunnel corrections. Sources of inaccuracies- buoyancy, solid blockage, wake blockage, streamline curvature causes, estimation, correction. Total correction on airspeed, dynamic pressure, zero lift drag. wind tunnel balances Load measurements-wind tunnel balances, types, description, application.

UNIT- IV FLOW MEASUREMENTS- INSTRUMENTATION Steady and unsteady pressure measurements and various types of pressure probes and transducers, errors in pressure measurements; measurement of temperature using thermocouples, resistance thermometers, temperature sensitive paints and liquid crystals; measurement of airspeed, flow direction, boundary layer profile using Pitot static tubes, 5 hole probes, total head rake- function, working principle, types, details of design and construction, use. Hot Wire Anemometry, Laser Doppler Anemometry, Particle Image Velocimetry- working principles, description of equipment, experimental setup, settings, calibration, measurement, data processing , applications.

UNIT- V FLOW VISUALISATION TECHNIQUES Flow visualization- need, types- tufts, china clay, oil film, smoke- working principle, description, setting up, operation, observation, recording, interpretation of imagery, relative merits, applications. High speed flows- optical methods of shadowgraphy, Schleiren, interferometry.

TEXT BOOKS

1. Low Speed Wind Tunnel Testing, Barlow, J.B., Rae, W.H., Pope, A., Wiley 1999.
2. High Speed Wind Tunnel Testing, Pope, A. and Goin, K.L., Wiley, 1965.
3. Yang, W.J., Handbook of Flow Visualization, 2nd edition, Taylor and Francis, 2001.

OPEN ELECTIVES II

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. I Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE II

(R18A1251)MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVE:

1) To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
2) To learn how to plan for information systems &implementation
3) To study about security aspects of information systems

UNIT-I:

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

UNIT-II:

Business Applications of Information Systems : E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

UNIT-IV:

Building of Information Systems: System Development Stages, System Development Approaches.

Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.

Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V:

Introduction to Cyber Crime : Cyber Crime Defination and orgin of the word,cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and indian ITA 2000,Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOK

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCE:

1. Nina Godbole & Sunit Belapure " Cyber Security" Wiley india 2012.

2. Jawadekar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
4. A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
5. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP - https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) - https://magento.com/
8. Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS - http://www.lumina.com
10. OpenRules – Business Rules and Decision Management system - http://openrules.com/

COURSE OUTCOME:

1) Ability to apply Concepts & applications of Management Information Systems.
2) Ability to perform Information Systems Planning & Implementations.
3) Ability to adapt Cyber crime and information security procedures.

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OPEN ELECTIVE II

(R18A0552) INTRODUCTION TO JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

1) to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
2) use data types, arrays and strings;
3) implement error-handling techniques using exception handling,
4) create and event-driven GUI using AWT components.

UNIT I: OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.

Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, BufferedReader class, Scanner class, StringTokenizer class, inner class.

UNIT II: Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III: Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV: Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V: GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT controls: Labels, button, text field, check box, and graphics.

Layout Manager – Layout manager types: border, grid and flow.

Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

COURSE OUTCOMES:

1) An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high level language;
3) An appreciation of the principles of object oriented programming;
4) An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
5) Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
6) Be able to make use of members of classes found in the Java API.
7) Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
8) Able to develop applications using Applet, awt and GUI Programming.

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III Year B.Tech. I Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE II

(R18A01252) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1) Understanding the specific roles within a software organization as related to project and process management
2) Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3) Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

UNIT-I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases .

UNIT-III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

Flows of the Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

Text Books:

1. Walker Royce, "Software Project Management", 1998, PEA.
2. Henry, "Software Project Management", Pearson.

Reference Books:

1. Richard H.Thayer." Software Engineering Project Management", 1997, IEEE Computer Society.
2. Shere K.D.: "Software Engineering and Management", 1998, PHI.
3. S.A. Kelkar, "Software Project Management: A Concise Study", PHI.
4. Hughes Cotterell, "Software Project Management", 2e, TMH. 88 5. Kaeron Conway, "Software Project Management from Concept to D

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

1) Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
2) Compare and differentiate organization structures and project structures.
3) Implement a project to manage project schedule, expenses and resource with the application of suitable project management tools

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III Year B.Tech. I Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE II

(R18A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1) To know the basics of ERP
2) To understand the key implementation of ERP
3) To know the business modules of ERP
4) To evaluate the current and future trends in ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition, 2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

1) To know the strategic importance of Enterprise Resource Planning
2) To Understand and implement ERP in various Sectors.

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III Year B. Tech I Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE II

(R18A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

1) To learn about basis of Nano Materials.
2) In this course we focus on synthetic aspects for the design of nanostructured materials.
3) We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.
4) The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes(CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of these nanostructures.
5) The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles,nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano-composites,

UNIT-II

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

Electrical properties: Switching glasses with nanoparticles, Electronic conduction with nano-particles.

Optical properties: Optical properties, special properties and the coloured glasses.

Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT–III Synthesis Routes: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV Tools to Characterize Nanomaterials: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT–V Applications of Nanomaterials: Nano-electronics, Micro- and Nano-

electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1) Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press-IIM.
2) Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
3) Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press 2004.

REFERENCES BOOKS:

1) Nano: The Essentials by T. Pradeep, McGraw- Hill Education.
2) Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.
3) Transport in Nano structures- David Ferry, Cambridge University press 2000
4) Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
5) Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6) Electron Transport in Mesoscopic systems – S. Dutta, Cambridge University press.
7) Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

COURSE OUTCOMES:

1) Will familiarize about the science of Nano Technology.
2) Will demonstrate the preparation of Nano Technology.
3) Will develop knowledge in characteristic Nano Technology & Nano Materials.

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	L	T/P/D	C
(R18A2183)AERODYNAMICS AND PROPULSION LAB	**0**	**-/3/-**	**1.5**

Objectives:

- To know the experimental procedure to find aerodynamic characteristics and functioning of wind tunnel components .
- To familiarize students and to expose them practically to various aircraft piston and gas turbine Engines.

AERODYNAMICS

1. Calibration of Wind Tunnel.
2. Pressure Distribution over an symmetric Airfoil
3. Pressure Distribution on a cylinder
4. Pressure Distribution over a sphere
5. Estimation of aerodynamics characteristics of NACA0012 airfoil
6. Efficiency of Vanes in Centrifugal blower

PROPULSION

7. Performance estimation for single cylinder four stroke Petrol engines.
8. Performance estimation and heat balance test for single cylinder four stroke Diesel engines.
9. Determination of Port timing and sketching for two stroke petrol engine.
10. Determination of Valve timing and sketching for four stroke diesel engine.
11. Estimating the efficiency of centrifugal compressor.
12. Estimating the efficiency of axial flow compressor.

Note: Any 10 Experiments can be conducted minimum 5 from each section

Equipment needed:

1. Low Speed Wind-tunnel Test Rig with a test section of 1 meter X 1 meter with necessary accessories.
2. Test Rig for Axial flow Compressor
3. Test rig for centrifugal flow compressor.
4. Heat Engine Test Rig.
5. Balancing test Rig
6. Bomb Calorimeter apparatus
7. Piston Engine

Reference Books:

1. Low speed wind tunnel testing, W.E. Rae & Allen Pope, John Willey&sons
2. Fundamentals of Aerodynamics by John D Anderson TATA MC GRAW HILL
3. Internal Combustion Engines by RK Rajput Laxmi Publications.

Outcomes

- The student can analyze aerodynamic performance various geometries.
- Ability to understand details of piston and gas turbine engine
- Ability to characterize various aircraft fuels

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ANE-I Sem

	L	T/P/D	C
(R18A2184) Aircraft Structures Lab	**0**	**-/3/-**	**1.5**

Objectives:

- To study the properties of materials used in Aircraft structure.
- To study the failure of different component under different loading condition

LIST OF EXPERIMENTS:-

1. Tensile testing using universal Testing Machine - Stress - strain curves and strength tests for various engineering materials.
2. Bending tests - Stress and deflection of beams for various end conditions
3. Compression tests on long columns - Critical buckling loads
4. Compression tests on short columns - Critical buckling loads
5. Failure strength of riveted joints.
6. Failure strength of bolted joints.
7. NDT inspection methods.
8. Shear Center of open and closed sections.
9. To calculate instability of a Wagner beam
10. Deflection of a simply supported beam with varying load conditions.
11. Unsymmetrical bending of cantilever beam
12. Verification of principle of superposition

Note: Any10 Experiments should be conducted

Equipment needed

1. UTM – 20 / 40 Tons with. Jigs and Fixtures
2. Deflection test rig (Fabricated hardware + precession dial gauge)
3. NDT Equipment. a) Ultrasonic apparatus, b) Magnetic Particle test rig, c) Dye penetration test.
4. Various Hardware rigs desired in the lab for specific test.
5. Photo and magnetic speed setup
6. Vibration beam setup
7. Shear Center of open and closed section setup.

Reference Books:

1. Megson, T.M.G., Aircraft Structures for Engineering Students, Edward Arnold, 1985.
2. Bruhn. E.H, Analysis and Design of Flight Vehicles Structures, tri -state off set company, USA, 1965

Outcomes:

- Ability to perform non-destructive testing to predict the properties of metabolic materials used in aircraft application

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III Year B. Tech, ANE-I Sem

	L	T/P/D	C
(R18A0521) CYBER SECURITY	**2**	**-/-/-**	**0**

-Course objectives:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

Course Outcomes: The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy.

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for

organizations, social computing and the associated challenges for organizations. **Cybercrime and Cyber terrorism:** Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Datalinking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances. **Mini-Cases:** The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley

2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&FGroup.

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III Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R18A2114) FINITE ELEMENT ANALYSIS	**3**	**-/-/-**	**3**

Objectives:

- It covers the fundamental theoretical approach beginning with a review of differential equations, boundary conditions, integral forms, interpolation, parametric geometry, numerical integration, and matrix algebra.
- Next, engineering applications to field analysis, stress analysis and vibrations are introduced. Time dependent problems are also treated.
- Students are also introduced, by means of selected tutorials, to the commercial finite element system SolidWorks which is similar to one they could be expected to use upon graduation. Graduate students will also be introduced to the more powerful (and difficult to use) Ansys system.

UNIT – I

Introduction to Finite Element Method for solving field problems. Stress and Equilibrium. Strain – Displacement relations. Stress – strain relations. One Dimensional problems: Finite element modeling coordinates and shape functions. Potential Energy approach: Assembly of Global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions, Quadratic shape functions.

UNIT – II

Analysis of Beams: Element stiffness matrix for two node, two degrees of freedom per node beam element.

Analysis of Trusses: Stiffness matrix for plain truss elements, stress calculations and problems.

UNIT – III

Finite element modelling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions. Finite element modelling of Axisymmetric solids subjected to Axisymmetric loading with triangular elements. Two dimensional four noded isoparametric elements and numerical integration.

UNIT – IV

Steady state heat transfer analysis: one dimensional analysis of a fin and two dimensional analysis of thin plate.

UNIT-V

Dynamic Analysis: Formulation of finite element model, element matrices, evaluation of Eigen values and Eigen vectors for a stepped bar and a beam.

Text Books:

1. Introduction to Finite Elements in Engineering / Chandraputla, Ashok and Belegundu /Prentice – Hall.
2. The Finite Element Methods in Engineering / SS Rao / Pergamon.
3. The Finite Element Method for Engineers – Kenneth H. Huebner, Donald L. Dewhirst, Douglas E. Smith and Ted G. Byrom / John Wiley & sons (ASIA) Pte Ltd.

Reference Books:

1. An introduction to Finite Element Method / JN Reddy / Me Graw Hill
2. Finite Element Methods/ Alavala/TMH
3. Finite Element Analysis/ C.S.Krishna Murthy

Outcomes:

- Upon completion of the course students should be able to correlate a differential equation and its equivalent integral form.
- Understand parametric interpolation and parametric geometry enforce essential boundary conditions to a matrix system.

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III Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R18A2115) Aerospace Propulsion Systems	**3**	**-/-/-**	**3**

Objective:

- Students acquire knowledge about the present space equipment.
- Students can focus on various launch systems available in aerospace industry and also understand the future scenario.
- To provide an exposure with testing and design limitations.

UNIT-I
HYPERSONIC AIR-BREATHING PROPULSION

Ramjets at high speeds and limitations of turbojets. Need for supersonic combustion, Implications criticality of efficient diffusion and acceleration, problems of combustion in high speed flow, scramjet engine- construction, flow process- description, spill-over drag, plume drag. Isolator, combustor, thermal protection, thermal throat, scheduled &distributed fuel injection. Types of nozzles and nozzle flow. Scramjet performance- numericals.

Combined cycle engines- turbo-ramjet, Air turbo-rocket (ATR), ejector ramjet, Liquid-air collection engine (LACE) - need, principle, construction, operation, performance.

UNIT-II
CHEMICAL ROCKET PROPULSION

Classification of rocket engine, chemical rocket engine types, working principle, schematic diagram, applications, types, advantages and disadvantages- solid, liquid and hybrid propellant rocket engine, TVC.

Solid propellant rocket motors, principle, applications, Solid propellant types, composition, properties, Propellant grain, properties, structural design, insulators and inhibitors- functions, requirements, Rocket motor casing- materials. Igniters, types, construction, Liquid propellants- types, composition, properties, performance, Propellant, feed systems- pressurisation, injectors, starting and ignition, cryogenic engines, Engine cooling.

UNIT-III NUCLEAR ROCKET PROPULSION: Nuclear propulsion history, Power, thrust, energy. Nuclear fission- basics, sustainable chain reaction, neutron leakage, control, reflection, prompt and delayed neutrons, thermal stability. Principles and fuel elements. The nuclear thermal

rocket engine, start-up and shutdown. Development status of nuclear engines, alternative reactor types, safety issues in nuclear propelled missions.

UNIT-IV ADVANCED ROCKET PROPULSION

ELECTRICAL: Limitations of chemical rocket engines. Electric propulsion systems- structure, types, generation of thrust. Electrostatic thrusters, electro-magnetic thrusters, applications to space missions, pulsed plasma thrusters (PPT) for micro-spacecraft, solar electric propulsion.

ADVANCED SYSTEMS: Micro-propulsion, application of MEMS, chemical, electric micro-thrusters, principle, description, Propellantless propulsion, teethers, momentum exchange, Photon rocket, beamed energy propulsion, solar, magnetic sails.

UNIT V LAUNCH VEHICLES

Role and military functions of space launch vehicle, Types, missions, mission profile, staging employed in the vehicle, guidance and control requirements. Some successful launch vehicles, Description of space shuttle engine, Propellant slosh - Propellant hammer, geysering effect in cryogenic rocket engines, SSTO.

Text Books:

1. Cornelisse, J. W., Schoyer H.F.R. and Wakker, K.F., Rocket propulsion and space flight Dynamics, Pitman, 1979.
2. Turner, M.J.L., Rocket and Spacecraft Propulsion, Springer, 2001.

Outcome:

- Students can correlate with the different launch vehicles and missiles available.
- Students will be able to configure the launch vehicle or missile required for specific purpose.
- Students will be able to design the conceptual requirements.

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III Year B. Tech, ANE-II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A1205) ARTIFICIALINTELLIGENCE

Course Objectives: To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents **Basic Search Strategies**: Problem Spaces, Uninformed Search (Breadth- First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning

Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non- monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice- Hall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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III Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R18A2134)FLIGHT SCHEDULING AND OPERATIONS PROFESSIONAL ELECTIVE – II	**3**	**-/-/-**	**3**

Objectives:

- Students will able to know about the operations of an airline
- Will analyze how the scheduling is done for flights
- Will know about crew duties and passengers boarding procedures

UNIT I

AIRLINE NETWORK AND AIRCRAFT ROUTING

Complexity of airline planning, operations and dispatch- need for optimization- Networks- definitions, network flow models shortest path problem, minimum cost flow problem maximum flow problem, multi-commodity problem. Integer programming models- set covering/ partitioning problems, traveling salesman problem- mathematical formulation- decision variables, objective function, constraints. Goal of aircraft routing- maintenance requirements, other constraints Routing cycles, route generators Mathematical models of routing- decision variables, objective functions, alternatives, constraints- flight coverage and aircraft available Example problems and solutions

UNIT II

FLIGHT AND FLEET SCHEDULING

Significance of flight scheduling. The route system of the airlines- point-to-point flights, hub and spoke flights Schedule construction- operational feasibility, economic viability Route development and flight scheduling process- load factor and frequency Case study. Purpose of fleet assignment. Fleet types, fleet diversity, fleet availability- performance measures Formulation of the fleet assignment problem- decision variables, objective function, constraints, solution Scenario analysis, fleet assignment models.

UNIT III

CREW AND MANPOWER SCHEDULING

Crew scheduling process- significance Development of crew pairing- pairing generators- mathematical formulation of crew pairing problem- methods of solution. Crew rostering- rostering practices .The crew rostering problem-formulation, solutions. Man power scheduling- modeling, formulation of the problem, solutions.

UNIT IV

GATE ASSIGNMENT AND AIRCRAFT BOARDING STRATEGY

Gate assignment- significance- the problem- levels of handling-passenger flow, distance matrix- mathematical formulation, solution Common strategies for aircraft boarding process, mathematical model, interferences, model description, aisle interferences.

UNIT V

AIRLINE IRREGULAR OPERATION, DISRUPTION OF SCHEDULE AND RECOVERY COMUTATIONAL COMPLEXITY-CASE STUDIES

The problem statement, the time band approximation model formulation of the problem the scenarios-solution.Complexity theory, heuristic procedures Case studies of airline operation and scheduling study through simulation modeling- use of available software.

Text Books:

1. Bazargan,M.,'Airline Operations and Scheduling'2nd edn., Ashgate Publishing ltd, 2010

Outcomes:

- Students can schedule different operations done by airport authorities.
- Students can schedule different operations done by airlines authorities.
- They will be getting a knowledge about the functioning of airports

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R18A2135) AIR TRANSPORTATION SYSTEMS (PROFESSIONAL ELECTIVE – II)	**3**	**-/-/-**	**3**

Objectives:

- The subject will introduce the air transportation systems in detail.
- To study the basic governing bodies of ATS, its laws and regulations
- To understand the Airspace sectors, setting up Airport, Airlines and economic considerations involved in it

UNIT-I

Aviation industry & its regulatory authorities: Introduction, history of aviation-evolution, development, growth, challenges. Air transportation industry-economic impact- types and causes. The breadth of regulation- ICAO, IATA, national authorities (DGCA, FAA). Safety regulations-risk assessment-human factors and safety, security regulations, environmental regulations.

UNIT-II

Airspace: Airspace and air traffic management, Categories of airspace-separation minima, airspace sectors-capacity, demand and delay. Evolution of air traffic control system-procedural ATC system, procedural ATC with radar assistance, first generation 'automated' ATC system, current generation radar and computer-based ATC systems. ICAO future air-navigation system.

UNIT-III

Aircraft: Costs-project cash-flow, aircraft price. Compatibility with the operational infrastructure. Direct and indirect operating costs. Balancing efficiency and effectiveness-payload-range, fuel efficiency, technical contribution to performance, operating speed and altitude, aircraft field length performance. Effectiveness-wake-vortices, cabin dimensions, flight deck.

UNIT- IV

Airlines: Setting up an airline-modern airline objectives. Structure of Airline Industry (Domestic & International) Route selection and development, annual utilization and aircraft size, seating arrangements. Aircraft- buy or lease. Revenue generation and yield management. Airline scheduling, Factors in Fleet Planning-Hub-and-Spoke System.

UNIT-V

ENVIRONMENTAL CONTROL

Noise, Characteristics, Evaluation of Noise in the Vicinity of Airports, Aircraft Noise Measurement, Short Term Measurement, Long-term Noise Monitoring, Prediction of Air Transport Noise, Airport Noise

Mitigation and Noise Abatement Procedures , Control of Gaseous Emissions, Bird Control, Bird Strike Statistics.

Text Books:

1. Hirst, M., The Air Transport System,Wood head Publishing Ltd,Cambridge, England, 2008.
2. Antonin Kazda, Robert E Caves , Airport design and operation, Second edition, Elseiver, 2007.

Reference Books:

1. Wensven, J.G.,AirTransportion:A Management Perspective, Ashgate, 2007.
2. Belobaba,P.,Odoni,A.andBarnhart,C.,Global Airline Industry, Wiley,2009.
3. M.Bazargan,M., Airline operations and Scheduling Ashgate, 2004.
4. Nolan,M.s., Fundamentals of Air Traffic Control,fourthedn., Thomson Learning, 2004.
5. Wells, A. and young, S.,Airport Planning and Management, fifth edn., McGraw-Hill, 1986.

Outcomes:

- The operational structure of the Airport, its establishing, working strategies in detail
- The economic and the business outcomes of the operations of ATS

The student with acquire operational knowledge of air transport system

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III Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A2136) AIRFRAME STRUCTURAL DESIGN (PROFESSIONAL ELECTIVE – II)

Objectives:

- To know about detailed structural components present in aircraft
- To acquire the knowledge about the design parameters how why and where they will be used in manufacturing
- Students can acquire the knowledge about the loading conditions done on the structure

UNIT I

INTRODUCTION

Principal structural components of aircraft. Design requirements- structural integrity, stiffness, service life. Baseline aerodynamic configuration, Air loads, external loading, weight, operating conditions, conformity to government regulations.

Unit II

FASTENERS AND STRUCTURAL JOINTS

Fasteners and fittings- role, significance, general design considerations, Fastener systems, types, fastener information, dimensions, materials, allowable strength- tensile, shear, bending. Rivets, bolts and screws, nuts-detail design consideration. Fittings- lugs, bushings and bearings-loading design and analysis. Joints – splices, eccentric, gusset, welded, brazed, bonded- types, methods of joining, failure modes.

UNIT III

DESIGN OF WING AND TAIL STRUCTURES

The wing- role- summary of wing loads, structural components- wing box, leading and trailing edges. Wing layout- location of spars, ailerons and flaps, rib spacing and direction, root rib bulkhead, span wise stiffeners, wing covers- skin-stringer panels, integrally stiffened panels, access holes, attachment of leading edge and trailing edge panels Spars- general rules of spar design. Ribs and bulkheads- rib spacing and arrangement .Wing root joints, carry through structure. Fighter wing design- problems with swept wings Wing box- loads, stress .Wing box, root bulkhead. Leading and trailing edge assembly- control surfaces, flaps- structure. Tail unit- horizontal, vertical tail, elevator, rudder- configuration.

UNIT IV

DESIGN OF FUSELAGE AND LANDING GEAR

Function of fuselage- loading, general requirements. Ultimate strength of stiffened cylindrical structure. Principal structural components –skin and stringers, frame and floor beam, pressure bulkheads, wing & fuselage intersection- layout, stress analysis, sizing. Forward fuselage, aft, fuselage structures, fuselage openings- windows, doors- design considerations. Landing gear- purpose, types, general arrangement, loads- design considerations- ground handling, take-off, landing, braking, pavement loading, support

structure. stowage and retraction, gear lock- kinematic design Shock absorbers- function, types, components, operation, loads, materials, design. Wheels and brakes.

UNIT V

FATIGUE LIFE, DAMAGE TOLERANCE, FAIL SAFE- SAFE DESIGN-WEIGHT CONTROL AND BALANCE

Catastrophic effects of fatigue failure- examples- modes of failure- design criteria- fatigue stress, fatigue performance, fatigue life. Fatigue design philosophy- fail-safe, safe life. Significance Fail-safe design- the concept, requirements, damage tolerance.

Text Books:

1. NIU.M.C. Airframe Structural Design, second edition, Hongkong Conmlit Press, 1988, ISBN: 962-7128-09-0
2. NIU.M.C. Airframe Stress Analysis And Sizing, second edition, Hongkong Conmlit Press, 1987, ISBN: 962-7128-08-2

Out comes:

- Students will be acquainted with design criteria of aircraft component
- Students will be acquainted with manufacturing procedure from the design criteria
- Students will easily design their own components based on the design criteria they have learned

OPEN ELECTIVES III

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem | **L** | **T/P/D** | **C**
3 | **-/-/-** | **3**

OPEN ELECTIVE III

(R18A0452) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

1. This introductory course is valuable for students who wish to learn about robotics through a study of industrial robot systems analysis and design.
2. This course is suited to students from engineering and science backgrounds that wish to broaden their knowledge through working on a subject that integrates multi-disciplinary technologies.

UNIT – I

Introduction & Basic Definitions: History pf robots-robot anatomy, Coordinate Systems, Human arm Characteristics, Cartesian, Cylindrical, Polar, coordinate frames, mapping transform.

UNIT – II

Kinematics – Inverse Kinematics: Kinematics, Mechanical structure and notations, description of links and joints, Denavit Hatenberg notation, manipulator transformation matrix, examples inverse kinematics.

UNIT – III

Differential Motion – Statics – Dynamic Modeling: Velocity Propagation along links, manipulator Jacobian – Jacobian singularities – Lagrange Euler formulation Newton Euler formulation basics of trajectory planning.

UNIT – IV

Robot Systems : Actuators Sensors and Vision: Hydraulic and Electrical Systems Including Pumps, valves, solenoids, cylinders, stepper motors, Encoders and AC Motors Range and use of sensors, Micro switches, Resistance Transducers, Piezo-electric, Infrared and Lasers Applications of Sensors : Reed Switches, Ultrasonic, Barcode Readers and RFID – Fundamentals of Robotic vision.

UNIT – V

Robots and Applications: Industrial Applications – Processing applications – Assembly applications, Inspection applications, Non Industrial applications.

TEXTBOOKS

1. Robotics and Control: R.K. Mittal and I.J. Nagarath, TMH 2003.
2. Introduction to Robotics – P.J. Mckerrow, ISBN: 0201182408

REFERENCES

1. Robotics – K.S. Fu, R.C. Gonzalez and C.S.G. Lee, 2008, TMH.
2. Introduction to Robotics – S. Nikv, 2001, Prentice Hall,
3. Mechatronics and Robotics: Design & Applications – A. Mutanbara, 1999, CRC Press.

COURSE OUTCOMES:

Upon the completion of this course, the student will be able to:

1. Describe the various elements that make an industrial robot system
2. Discuss various applications of industrial robot systems

3. Analyze robot manipulators in terms of their kinematics, kinetics, and control
4. Model robot manipulators and analyze their performance, through running simulations using a MATLAB-based Robot Toolbox
5. Select an appropriate robotic system for a given application and discuss the limitations of such a system
6. Program and control an industrial robot system that performs a specific task.

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III Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE III

(R18A0453) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

1) To study IoT Networking Core
2) To study IoT related network fundamentals
3) To study IoT Architecture.
4) To study IoT Application Development procedure
5) To study various case studies and IoT applications.

Unit 1: The IoT Networking Core :

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

Unit 2: Network Fundamentals:

Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

Unit 3: IoT Architecture:

History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis. The Architecture The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

Unit 4: IoT Application Development:

Application Protocols MQTT, REST/HTTP, CoAP, MySQL.

Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools

Unit 5: Case Study & IoT Applications:

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata McGraw Hill, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

At the end of the course, the student will be able to

1) Understand IoT Networking Core
2) Understand IoT related network fundamentals
3) Understand IoT Architecture.
4) Understand IoT Application Development procedure
5) Understand various case studies and IoT applications.

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III Year B.Tech - II Sem

L	T/P/D	C
3	-/-/-	3

(OPEN ELECTIVE - III)

(R18A1253) SOFTWARE TESTING TECHNIQUES

COURSE OBJECTIVES:

1) Knowing the concepts of Software Engineering and software development life cycle.
2) Understanding the foundations, techniques, and tools in the area of software testing and its practice in the industry.
3) Learning the functional aspect of the various testing techniques.
4) Knowledge of the creation of test cases and usage of testing tools.

UNIT - I INTRODUCTION

Software, Software Engineering, Process Models: Waterfall Model, Spiral Model, Prototyping, V Model. Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester – Independent Verification and Validation.

UNIT - II SOFTWARE TESTING REQUIREMENTS

Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews: Peer Review – Walkthrough - Inspection - Checklists of Review Process - Review Log.

UNIT - III TESTING TECHNIQUES

White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision/Branch Coverage – Basic Path Testing – Control Flow Graph Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques: Boundary Value Analysis – Equivalent Class Partition – Cause-Effect Analysis – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.

UNIT - IV TESTING TYPES

Unit Testing, Functional Testing: Smoke Testing – Integration, System Testing, User Acceptance Testing - Non Functional Testing:– Performance Testing – Recovery Testing – Security Testing – Compatibility Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - Data ware House Testing and Business Intelligence Testing – SOA Testing - Mobile Testing.

UNIT - V TEST CASE DESIGN

Definition of Test Case - Standards, Guidelines and Naming Conventions – Characteristics of Good Test Cases – Test Case templates – Creation of Test Case – Requirement Coverage – Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting of Test Execution – Definition of Risk - Risk Based Testing Approach.

Overview of Testing Tools like Winrunner, Loadrunner, Selenium, JMeter.

TEXT BOOKS :

1. Software Testing Techniques – BorisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
3. S.Subashni, N.Satheesh Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, ”Software Testing”, Umayam Publications , First edition, 2013.

REFERENCE BOOKS:

1. Srinivasan Desikan, Gopalaswamy Ramesh,”Software Testing: Principles and Practice”, Pearson Education India, First Impression 2006.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing Concepts and Tools:P.NageshwarRao, dreamtechPress.
4. Art of Software Testing – Meyers, John Wiley.
5. Software Testing in the Real World – Edward Kit, Pearson.

COURSE OUTCOMES:

1) Analyze the strategies for software testing.
2) Identify the issues in test management and testing activity.
3) Apply the suitable testing strategy for a given application.
4) Development of test cases and selection of appropriate testing tool.

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III Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE III

(R18A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

1) To facilitate the understanding of Quality Management principles and process.
2) To understand Customer focus, Employee focus and their involvement and Supplier Management.

UNIT – I

Introduction, The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

Customer Focus and Satisfaction: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOK:

- Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
- Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

- Beyond TQM / Robert L.Flood
- Total quality management by Paneer Selvam
- Statistical Quality Control / E.L. Grant.
- Total Quality Management:A Practical Approach/H. Lal
- Quality Management/Kanishka Bedi/Oxford University Press/2011
- Total Engineering Quality Management/Sunil Sharma/Macmillan

COURSE OUTCOMES:

1) The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
2) To give the students an overview of TQM, various Quality aspects and importance of Top Management Commitment in any organization for maintaining product / services quality.

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III Year B.Tech. II Sem | **L** | **T/P/D** | **C**
3 | **-/-/-** | **3**

(OPEN ELECTIVE - III)

(R18A0251) ELECTRICAL SYSTEMS & APPLICATIONS

COURSE OBJECTIVES:

- To introduce the fundamental concepts of electro mechanical energy conversion
- To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

UNIT- I

ELECTRICAL SYSTEM COMPONENTS: LT system wiring components, Selection of Cables, Wires, Switches, Distribution Box, Metering System, Tariff structure, Protection Components- Fuse, MCB, MCCB, ELCB, Inverse current characteristics, Symbols, Single Line Diagram (SLD) of a wiring system, Contactor, Isolator,Relays, MPCB, Electric shock and Electrical safety practices.

UNIT- II

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS: Types of residential and commercial wiring systems, general rules and guidelines for installation. Load calculation and sizing of wire, rating of main switch, distribution board and protection devices. Earthing system calculations.Requirements of commercial installation- deciding lighting scheme and number of lamps, earthing of commercial installation, selectionand sizing of components.

UNIT- III

ILLUMINATION SYSTEMS: Understanding various terms related to light intensity, Lumens, candle power, lamp efficiency,specific consumption.Various illumination schemes- Incandescent lamps, modern luminaries like CFL, LED andtheir operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

UNIT-IV:

INDUSTRIAL ELECTRICAL SYSTEMS: UPS System-Types, Principle of operation.Battery banks, sizing theUPS and Battery Banks, Selection of UPS and Battery Banks.

UNIT-V:

SINGLE PHASE AC MOTOR AND SPECIAL MOTORS: Constructional features, Principle of operation, Characteristics, Speed control and Applications of Single phase AC motor, Stepper motor, Brushless DC motor and Universal motor(Qualitative Treatment only).

TEXT BOOKS:

1. S. L. Uppal and G. C. Garg, “Electrical Wiring, Estimating & Costing”, Khannapublishers, 2008.
2. K. B. Raina, “Electrical Design, Estimating & Costing”, New age International, 2007.
3. H. Joshi, “Residential Commercial and Industrial Systems”, McGraw Hill Education, 2008.

REFERENCE BOOKS:

1. N.V. Suryanarayana, “Utilization of Electrical Power including Electric drives and Electric traction”, New Age International (P) Limited Publishers, 1st Edition, 1994.
2. E. Open Shaw Taylor, “Utilization of Electric Energy”, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

- Maintain/Troubleshoot various lamps and fittings in use.
- Design Illumination systems for various applications.
- Utilize effectively the electrical systems in industries.

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III Year B. Tech, ANE-II Sem	L	T/P/D	C
OPEN ELECTIVE III	**3**	**-/-/-**	**3**
(R18A0554) OPERATING SYSTEM CONCEPTS			

OBJECTIVES:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols To know the components and management aspects of concurrency management

Unit I:

Introduction, objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

Unit-II:

Process Management:

Process concept, Process states, threads, **CPU Scheduling** - Scheduling algorithms, multiple processors and real time scheduling. **Process synchronization** – Critical section problems, Peterson's Solution, semaphores, monitors.

Unit-III:

Memory Management:

Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation. **Virtual memory** – Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

Unit-IV: **File Management**: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

Unit-V:

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.

Dead locks: Characterization, Dead lock Prevention, Dead lock Avoidance, Dead lock Detection and Recovery.

Text Book:

1. Operating Systems Concepts –Avil Silberschatz j, Peter Galvin, GreyGagne

Reference:

1. Modern Operating Systems –Andrew S. Tanenbaum, PHI

2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India

OUTCOMES:

At the end of the course the students are able to:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

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III Year B. Tech, ANE-II Sem

L	T/P/D	C
0	-/3/-	1.5

(R18A2185)COMPUTATIONAL STRUCTURES LAB

Objectives:

- To obtain an understanding of the fundamental theory of the FEA method;
- To understand the use of the basic finite elements for structural applications using truss, beam, frame, and plane elements; and
- To understand the application and use of the FE method for Aerospace problems.

LIST OF EXPERIMENTS:-

1. Stress Analysis of Thickened Thin Walled Open Section Panel.
2. Torsional Strength and Shear Force of Thin Walled Closed Section Panel.
3. Computational Analysis of Rectangular Stiffened Panel.
4. Static Analysis of Cantilever Beam.
5. Computational Analysis of Truss Structure.
6. Computational Analysis of Landing Gear.
7. Computational Analysis of Nose Cone.
8. Computational Analysis of Tapered Wing Structure.
9. Computational Analysis of Fuselage Structure
10. Computational Analysis of Nozzle.
11. Modal Analysis of Cantilever Beam
12. Introduction to UDEF and USERMAT

Note: Total 10 experiments are to be conducted.

Equipment Needed:

1. **Computers**: Core 2 duo processor with 1 GB RAM
1. **Softwares:** Ansys or NASTRAN or equivalent

Reference Books:

1. Aircraft STRUCTURES for Engineering Students 4th Edition by THG MEGHSON
2. Finite Element Simulations with ANSYS by Huei-Huang Lee

Outcomes:

- The ability to create models for trusses, frames, plate structures, machine parts, and components using ANSYS general-purpose software;
- To demonstrate the ability to evaluate and interpret FEA analysis results for design and evaluation purposes;

- To develop a basic understanding of the limitations of the FE method and understand the possible error sources in its use.

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III Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R18A2186) PROGRAMMING LANGUAGE FOR MATHEMATICAL MODELS LAB	**0**	**-/3/-**	**1.5**

Objectives:

The course should enable the students to:

1. Learn the mathematical programming language to solve problems related to modeling, analysis and design of aerospace vehicle and systems.

LIST OF EXPERIMENTS:

1. Introduction to modeling software, matrices, 2D and 3D plots.
2. Program to solve differential equations.
3. Program to solve system of equations using numerical methods.
4. Program to generate airfoil coordinates.
5. Program to find critical Mach number of an airfoil and to generate drag polar graph.
6. Program to find flow characteristics across shock waves.
7. Program to calculate the performance of turbofan.
8. Program to find the flow characteristics of a CD nozzle.
9. Program to calculate the deflection, bending moment, shear force of a beam.
10. Determine the buckling load of a column with different end conditions.
11. Find out displacements of a uniform bar/stepped bar subjected to mechanical/thermal loads.
12. Programs for modeling and analysis (state space equations) of aircraft longitudinal and lateral motion.

Note: Any 10 Experiments can be conducted.

EQUIPMENT NEEDED

1. **Computers**: Core 2 duo processor with 1 GB RAM
2. **Software:** MATLAB or SCILAB or equivalent software

REFERENCE BOOKS

1. MATLAB an Introduction with Applications Fifth Edition AMOS GILAT by WILEY Publications
2. Programming in SCI lab by VINU V DAS NEW AGE INTERNATIONAL PUBLICATIONS
3. Control system tool box in MATLAB, User's Guide.
4. Fundamentals of Aerodynamics by John D Anderson

Outcomes:

1. The student should be able to
2. Modeling and analysis of aerospace problems using computer software (MATLAB or others).
3. Design controller for automatic control of aircraft or other aerospace vehicle.

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	L	T/P/D	C
III Year B. Tech, ANE-II Sem			
(R18A0006)TECHNICAL COMMUNICATION AND SOFT SKILLS	**2**	**-/-/-**	**0**
(Mandatory Course)			

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

SYLLABUS

The textbook prescribed for study is a manual that has been compiled by the department of English to meet the academic and professional needs of the students.

UNIT I – Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT 2 - Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT 3 – Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT 4 - Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT 5 - Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCES:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies.

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IV YEAR B. Tech. AE – I SEM	L	T/P/D	C
	3	-/-/-	3

(R18A2116)Computational Aerodynamics

Objectives:

The course should enable the students to:

- Application of CFD to various engineering problems.
- Understand the physics of mathematical equations governing aerodynamic flows.
- Numerical methods to solve fluid flow problems

UNIT-I - INTRODUCTION TO COMPUTATIONAL FLUID DYNAMICS

CFD and its importance as research and design tool, General Procedure of CFD, Application of CFD to various Engineering problems. Models of fluid flow- Finite Control Volume, Infinitesimal Fluid Element. substantial derivatives, divergence of Velocity.

UNIT-II - GOVERNING EQUATIONS OF FLUID DYNAMICS

The continuity equation, momentum equation, energy equation, physical boundary conditions. Form of Governing equation suited for CFD - Conservation form - shock fitting and shock capturing. Impact of partial differential equations on CFD. Classification of Quasi-Linear Partial differential equation, The Eigen value method, General behavior of different classes of Partial differential equation – elliptic, parabolic and hyperbolic with examples.

UNIT-III – DISCRETIZATION TECHNIQUES

Introduction, Finite differences and formulas for first and second derivatives, difference equations, Explicit and implicit approaches. Basis of finite volume method- conditions on the finite volume selections- approaches - Cell-centered and cell-vertex. Definition of finite volume discretization general formulation of a numerical scheme.

UNIT-IV - GRID GENERATION

Need for grid generation. Structured grids- Cartesian grids, body fitted structured grids, Multi-block grids - overset grids with applications. Unstructured grids- triangular/ tetrahedral cells, hybrid grids, quadrilateral/hexahedra cells. Grid Generation techniques - Delaunay triangulation, Advance font method. Grid quality parameters.

UNIT-V – CFD TECHNIQUES

Lax-Wendroff technique, MacCormack's technique, Crank Nicholson technique, Relaxation technique, Alternating-Direction-Implicit (ADI) Technique. Pressure correction technique Numerical procedures-SIMPLE algorithm. Boundary conditions for the pressure correction method.

TEXT BOOKS

1. John .D. Anderson "Computational Fluid Dynamics", McGraw Hill
2. Charles Hirsch "Numerical computation of internal and external flows" Second Edition Butterworth-Heinemann is an imprint of Elsevier

REFERENCES

1. Hoffmann, K.A: Computational Fluid Dynamics for Engineers, Engineering Education System, Austin, Tex., 1989
2. J Blazek "Computational Fluid Dynamics: Principles and Applications" Elsevier.
3. Introduction to Computational Fluid Dynamics, Chow CY, John Wiley, 1979

Outcomes:

The student should be able to

- Solve differential equations governing fluid flow problems.
- Generation of grid according to geometry of flow.
- Application of CFD techniques for aerospace problems.

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IV Year B. Tech, ANE-I Sem

L	T/P/D	C
3	-/-/-	3

(R18A2117) MECHANICAL VIBRATIONS

Objectives:

- To gain fundamental knowledge on vibration and related systems in the context of Aircraft Structures
- To give Exposure on damped and undamped vibratory systems.
- Basic knowledge on dynamic balancing of rotor system

UNIT-I

FUNDAMENTALS OF VIBRATION: Brief history of vibration, Importance of the study of vibration, basic concepts of vibration, classification of vibrations, vibration analysis procedure, spring elements, mass or inertia elements, damping elements.

FREE VIBRATION OF SINGLE DEGREE OF FREEDOM SYSTEMS: Introduction, Free vibration of an undamped translational system, free vibration of an undamped torsional system. Concepts on different damping conditions.

UNIT-II

HARMONICALLY EXITED VIBRATIONS: Introduction, Equation of motion, response of an undamped system under harmonic force, Response of a damped system under harmonic force, forced vibration with coulomb damping, forced vibration with hysteresis damping.

UNIT-III

VIBRATION UNDER GENERAL FORCING CONDITIONS: Introduction, Response under a general periodic force, Two Degree of Freedom Systems: Introduction, Equation of motion for forced vibration, free vibration analysis of an undamped system, Torsional system, forced vibration analysis.

UNIT-IV

MULTIDEGREE OF FREEDOM SYSTEMS: Introduction, Modeling of Continuous systems as multi degree of freedom systems, Using Newton's second law to derive equations of motion, Determination Of Natural Frequencies and Mode Shapes: Introduction, Dunkerley's formula, Rayleigh's method, Holzers method, Matrix iteration method, Jacobi's method.

UNIT-V

CONTINUOUS SYSTEMS: Transverse vibration of a spring or a cable, longitudinal vibration of bar or rod, Torsional vibration of a bar or rod, Lateral vibration of beams.

Text Books:

1. Mechanical Vibrations by S.S.Rao.
2. Mechanical Vibrations by V.P.Singh

Reference Books:

1. Mechanical Vibrations by G.K. Grover
2. Mechanical Vibrations by W.T. Thomson
3. Mechanical vibrations: theory and application to structural dynamics, Michel Géradin, Daniel Rixen, John Wiley, 1997

Outcomes:

- Fundamental frequency of Multi- DOF systems can estimate by various methods.
- Effect of unbalance in rotating masses has been studied.
- How to determine eigenvalues and eigenvectors for a vibratory system has analysed

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	L	T/P/D	C
(R18A2118) FLIGHT VEHICLE DESIGN	**3**	**-/-/-**	**3**

OBJECTIVES OF THE COURSE:

1. To help students acquire knowledge of design process of an aircraft
2. To enable student to complete conceptual design to meet specified system requirements.

UNIT I: DESIGN PROCESS OVERVIEW, AIRFOIL AND GEOMETRY SELECTION, THRUST TO WEIGHT RATIO, WING LOADING

Overview of aircraft design, Phases of aircraft design. Aircraft conceptual design process, Sizing from conceptual sketch, Empty weight & fuel fraction estimation, Mission profiles, Mission segment weight fractions. L/D estimation. Take-off weight estimation. Airfoil and geometry selection, Airfoil design, Design lift coefficient, Stall, Airfoil thickness ratio, Airfoil considerations. Wing geometry (aspect ratio, wing sweep, tapper ratio and wing vertical location, wing tip shapes. Tail geometry and arrangements. Thrust to weight ratio & Wing loading- statistical estimation, thrust matching. Wing loading (for take-off, instantaneous/sustained turn rate, loiterer endurance, cruise range).

UNIT II: INITIAL SIZING & CONFIGURATION LAYOUT

Sizing with fixed engine and with rubber engine. Refined sizing equations/ methods. Geometry sizing of fuselage, Wing, Tail, Control surfaces. Development of configuration lay out from conceptual sketch. The inboard profile drawing, Wetted area, Volume distribution and fuel volume plots, Lofting- definition, significance and methods, flat wrap lofting. Special consideration in configuration lay out. Isobar tailoring Sears-Haack volume distribution, structural load paths. Radar, IR, visual detect ability, aural signature considerations.

UNIT III: CREW STATION,PASSENGERS &PAYLOAD, LANDING GEAR &SUBSYSTEMS, STRUCTURES,WEIGHT & BALANCE

Fuselage design- crew station, passenger compartment, cargo provisions, weapons carriage, gun installation, Landing gear arrangements, guidelines for lay out. Shock absorbers – types, sizing, stroke determination, gear load factors. Gear retraction geometry. Aircraft subsystems, significance to configuration lay out. Airworthiness requirements - loads, safety margins, material properties, methods of estimation- construction, operation, maintenance, training- procedures, Aircraft materials- mechanical properties- design data- allowable, allowable bases. Failure theory. Flight loads- atmospheric, maneuver- construction of flight envelope. Wing loads, Empennage loads, Fuselage loads.

UNIT IV: PERFORMANCE AND CONSTRAINT ANALYSIS REFINED SIZING & TRADE STUDIES

The aircraft operating envelope. Take off analysis, Balanced field length Landing analysis. Fighter performance measures of merit. Effects of wind on aircraft performance. Initial technical report of baseline design analysis and evaluation. Refined baseline design and report of specifications. Elements of life cycle cost, cost estimating method, RDT&E and production costs, operation and maintenance costs, fuel and oil costs, crew salaries Refined conceptual sizing methods. Sizing matrix plot and carpet plot. Trade studies - design trades, requirement trades, growth

sensitivities. Measures of merit Determination of final baseline design configuration, preparation of type specification report

UNIT V: STABILITY, CONTROL & HANDLING QUALITIES

Longitudinal static stability and control, aerodynamic center estimation, wing and tail lift and elevator, Estimation of wing, fuselage and nacelle pitching moment, thrust effect, trim analysis, take-off rotation, velocity stability, Lateral & directional stability and control, lateral-directional derivatives, aircraft dynamic characteristics, steady roll, pull up, inertia coupling, Introduction to handling qualities(Cooper harper rating scale), Spin recovery.

OUTCOMES

1. Students can complete conceptual design of a transport and fighter aircraft and estimate its performance including handling qualities against given requirements.

TEXT BOOK:

1. Raymer,D.P., Aircraft Design: A Conceptual Approach, 3rd edition., AIAA Education series, AIAA, 1999,ISBN: 1-56347-281-0

REFERENCE BOOK:

1. Howe, D., Aircraft Conceptual Design Synthesis, Professional Engineering Publishing, London,2000, ISBN:1-86058-301-6

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3	-/-/-	3

(R18A2119) AVIONICS

Objectives :

To introduce the students with functioning and principle of operation of various avionics systems including sensors installed on a modern passenger and fighter aircraft.

UNIT I: INTRODUCTION TO AVIONICS

Importance and role of Avionics in modern aircraft-systems which interface directly with pilot-aircraft state sensor systems, outside world sensor systems, task automation systems. The avionics equipment and system requirement- environmental, weight, reliability. Standardization and specification of avionics equipment and systems- ARINC and MIL specification. Electrical and optical data bus systems. Integrated modular avionics architectures.

UNIT II: DISPLAY &MAN-MACHINE INTERACTION AND COMMUNICATION SYSTEM

Introduction to displays-head-up displays(HUD)-basic principles, Helmet mounted displays, Head tracking systems. Head down displays-Civil cockpit, Military cockpit, Solid state standby display systems, Data fusion in displays-Intelligent display systems. Introduction to voice and data communication systems- HF,VHF,UHF and Satellite communications, Flight data recorders.

UNIT III: INERTIAL SENSORS, ATTITUDE DERIVATION AND AIR DATA SYSTEMS

Basic principles of gyroscope and accelerometers. Introduction to optical gyroscope- ring laser gyros-principles. Stable platform system-strap down systems- error in inertial systems and corrections.Air data Information and its use, derivation of Air Data Laws and relationship- altitude-static pressure relationship, variation of ground pressure, Speed of sound, Mach Number, CAS, TAS, Pressure error. Air data sensors and computing

UNIT IV: NAVIGATION (INS AND GPS) AND LANDING SYSTEM

Principles of Navigation,Types of Navigation systems-. Inertial Navigation System-Initial alignment and Gyro compassing, Strap down INS computing. Landing System- localizer and glide-slope-marker systems. Categories of ILS.Global navigation satellite systems-GPS-description and basic principles. Integration of GPS and INS, Differential GPS.

UNIT V: SURVEILLANCE AND AUTO FLIGHT SYSTEMS

Traffic alert and collision avoidance systems(TCAS)-Enhanced ground proximity warning system.Weather radar. Autopilots-Basic principle, height control, heading control, ILS coupled autopilot control, satellite

landing system, speed control and auto throttle. Flight management systems-principles-flight planning-navigation and Guidance, performance prediction and flight path optimization.

TEXT BOOKS

1. Collinson, R.P.G., Introduction to Avionics Systems, second edition, Springer,2003,ISBN 978-81-8489-795-1
2. Moir, I. and Seabridge, A., Civil Avionics Systems, AIAA education Series, AIAA, 2002, ISBN 1-56347589-8

REFERENCE BOOKS

1. Kayton, M., & Fried, W.R, Avionics Navigation Systems, Wiley, 1997,ISBN 0-471-54795-6Z

Outcomes:

1. The student would gain understanding of the basic principles of avionics system

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L	T/P/D	C
3	0	3

(R18A2137) CAD/CAM
PROFESSIONAL ELECTIVE –III

Objectives:

- To provide an overview of how computers are being used in design, development of manufacturing plans and manufacture
- To get effective knowledge on the usage of mathematical equations in model development through the computer.
- To understand different functions of computers in design and manufacturing.
- To understand the need for integration of CAD and CAM
- Study of different types of production, Knowledge of group technology (GT).
- Detailed study of Computer Aided Quality Control.

UNIT–I

Introduction: Computers in Industrial Manufacturing, Product cycle, CAD / CAM Hardware, Basic structure.

Computer Graphics: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, clipping.

UNIT–II

Geometric modeling: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

UNIT–III

Numerical control: NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming fundamentals, manual part programming methods, Computer Aided Part Programming.

UNIT–IV

Group Technology: Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

UNIT–V

Computer Aided Quality Control: Terminology in quality control, the computer in QC, contact inspection methods, noncontact inspection methods-optical, noncontact inspection methods-nonoptical, computer aided testing, integration of CAQC with CAD/CAM.

Computer integrated manufacturing systems: Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

TEXT BOOKS:

1. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH Publishers
2. CAD / CAM /A Zimmers & P.Groover/PE/PHI Publishers
3. Automation, Production systems & Computer integrated Manufacturing/ Groover/ Pearson Education

REFERENCE BOOKS:

1. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age Publishers
2. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson Edu
3. CAD/CAM: Concepts and Applications/Alavala/ PHI Publishers Computer Numerical Control Concepts and programming / Warren S Seames / Thomson Publishers
4. CAD / CAM – P N RAO McGraw Hill Publications

OUTCOMES: Student will be able to:

- Understand the applications of computer in the design and manufacturing.
- Understand and develop the Mathematical representations of curves used in geometric construction.
- Understand the concept and working principle of NC, CNC, and DNC and can develop a program using G and M codes.
- Make use of GT, FMS and CAPP concepts and are able to apply these concepts in bringing the benefits of mass production in real working environment.
- Plan the computer integrated production planning in working environment and able to analyze the quality of a product through computer aided quality control

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IV Year B. Tech, ANE-I Sem

L	T/P/D	C
3	-/-/-	3

(R18A2138) AIRCRAFT SYSTEMS
PROFESSIONAL ELECTIVE –III

OBJECTIVES OF THE COURSE: Student will be introduced to various aircraft system and their integration.

UNIT-I: INTRODUCTION TO AIRCRAFT SYSTEM:

Types of aircraft system-airframe, vehicle, avionics, mission and their subsystems. Specifications of requirements (mission and performance requirements). Operating environmental conditions. Need for integration. Enumeration of aircraft systems and some subsystems-purpose and very brief description.

UNIT-II: HYDRAULIC SYSTEM.

Function, merits and system loads. Principle components, pumps, reservoir and accumulator. Flight control actuation, need for redundancy. Hydraulic fluid properties requirements. Operating fluid pressures and flow rates. Landing gear and brake management system.

UNIT-III: ELECTRICAL SYSTEMS AND FLIGHT CONTROL SYSTEMS:

Electrical loads in aircraft, Electrical power generation and control-DC,AC. Power conversion and batteries. Load protection. Variable speed constant frequency(VSCF) Cyclo- converter, 27V DC system. Flight control systems-primary and secondary flight control. Flight control actuation systems in brief.

UNIT-IV: PNEUMATIC AND ENVIRONMENTAL CONTROL SYSTEMS:

Engine as a source of high pressure air-engine bleed air and its users. Wing and engine anti-ice system. Engine starting system. Pitot-static system. Principal heat sources in aircraft. Method of cooling-ram air, fuel cooling. Cooling system-air cycle refrigeration-types-turbo fan, bootstrap,reverse bootstrap systems. Cabin pressurisation. g-tolerance and protection. Molecular-Sieve oxygen concentrator.

UNIT-V: ENGINE CONTROL AND FUEL SYSTEM:

Principle of operation of aircraft gas turbine engine. Engine-airframe interface. Control of fuel flow, air flow, exhaust gas flow- need, means, system parameters, basic input and outputs. Limited authority and full authority engine control systems. Engine monitoring sensors and indicators. Power offtakes-need, types and effect on engine performance.Fuel system- components, fuel tank safety-fuel inerting system.

OUTCOMES:

1. The student will be able to appreciate the operation of various aircraft systems/subsystems and their integrated operation.

TEXT BOOKS

1. Moir, I. and Seabridge, A., Aircraft Systems: mechanical, Electrical and Avionics sub-systems Integration, 3 rd edition, John Wiley 2008, ISBN 978-0-470-05996-8

2. Moir, I. and Seabridge, A., Design and development of aircraft systems-an introduction, AIAA education series, AIAA,2004.

REFERENCES:

Aircraft systems by David A Lambro tata Mc Graw Hill. Ed;2009.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-I Sem

L	T/P/D	C
3	0	3

(R18A0318) HEAT TRANSFER
PROFESSIONAL ELECTIVE –III

***Note:** Heat and Mass Transfer data books are permitted

Objectives: The objective of this subject is to

- Provide knowledge about Heat transfer through conduction, convection and radiation.
- Learn different modes of Heat Transfer.
- Understand and apply the dimensional analysis.
- Develop the empirical relations for fluid flow heat transfer.

UNIT-I

Introduction: Basic modes of heat transfer- Rate equations – Differential heat conduction equation in Cartesian, Cylindrical and Spherical coordinate systems. Steady state one dimensional heat conduction solutions for plain and composite slabs, cylinders and spheres, electrical resistance concept - Critical thickness of insulation- Heat conduction through fins of uniform and variable cross section- Fin effectiveness and efficiency.

UNIT-II

Unsteady state Heat Transfer conduction: I-D Transient heat conduction- Lumped system analysis, and solutions by use of Heisler charts.

UNIT-III

Convection: Dimensional analysis- Continuity, momentum and energy equations - Boundary layer theory concept- Free, and Forced convection- Approximate solution of the boundary layer equations - Laminar and turbulent heat transfer correlation- Application of dimensional analysis to free and forced convection problems- Dimensionless numbers and Empirical correlations.

UNIT-IV

Heat Exchangers: Types of heat exchangers- Parallel flow- Counter flow- Cross flow heat exchangers- Overall heat transfer coefficient- LMTD and NTU methods- Fouling factor - Heat exchangers with phase change.

Boiling and Condensation: Different regimes of boiling- Nucleate, Transition and Film boiling. Condensation: Laminar film condensation-Empirical relations, Nusselt's theory- Condensation on vertical flat plate and horizontal tubes- Drop wise condensation.

UNIT- V

Radiation: Black body radiation- radiation field, Kirchhoff's laws- shape factor- Stefan Boltzman equation- Heat radiation through absorbing media- Radiant heat exchange, parallel and perpendicular surfaces - Radiation shields.

TEXT BOOKS:

1. Heat Transfer, by J.P.Holman, Int.Student edition, McGraw Hill Book Company.
2. Fundamentals of Heat and Mass Transfer- Sachdeva, New Age Publications

REFERENCE BOOKS:

1. Heat Transfer by S.P.Sukhatme.
2. Heat transfer by Yunus A Cengel.
3. Heat transfer by Arora and Domakundwar, Dhanpat Rai & sons, New Delhi

OUTCOMES: At the end of this course, student will be able to

- Understand how heat and energy is transferred between the elements of a system for different configurations.
- Solve problems involving one or more modes of heat transfer**.**
- Student gets the exposure to different modes of Heat Transfer.
- Design the extended surfaces like fins for better heat transfer

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IV Year B. Tech, ANE-I Sem

L	T/P/D	C
0	-/3/-	1.5

(R18A2187)COMPUTATIONAL AERODYNAMICS LAB

Objectives:

- To develop an understanding for the major theories, approaches and methodologies used in CFD.
- To build up the skills in the actual implementation of CFD methods (e.g. boundary conditions, turbulence modeling etc.) in using commercial CFD codes.
- To gain experience in the application of CFD analysis to real engineering designs.

LIST OF EXPERIMENTS:

1. Numerical simulation of Flow over an airfoil using commercial software
2. Numerical simulation of Supersonic flow over a wedge using commercial Software
3. Numerical simulation of Flat plate boundary layer using commercial software
4. Numerical simulation of Laminar flow through pipe using commercial software
5. Numerical simulation of Flow past cylinder using commercial software
6. Numerical simulation of flow through nozzle using commercial software
7. Numerical simulation of flow over wing using commercial software
8. Numerical simulation of combustion using commercial software
9. Solution for the one dimensional wave equations using explicit method of lax using finite Difference method (code development)
10. Solution for the one dimensional heat conduction equation using explicit method using finite difference method (code development)
11. Generation of the Algebraic Grid (code development)
12. Generation of the Elliptic Grids (code development)

Note: Any 10 Experiments can be conducted.

Equipment Needed:

1. **Computers**: Core 2 duo processor with 1 GB RAM
2. **Softwares:** Matlab or scilab and Ansys or equivalent softwares

Reference Books:

1. MATLAB an Introduction with Applications Fifth Edition AMOS GILAT by WILEY Publications
2. Programming in SCI lab by VINU V DAS New Age International Publications
3. ANSYS FLUENT and CFX Tutorials

Outcomes:

- Students will develop a better intuition of Aerodynamics more quickly than is possible with traditional analytical approaches.

- Ability to undertake problem identification, formulation and solution and apply knowledge of basic science and engineering fundamentals.
- Developing a geometrical model of the flow, applying appropriate boundary conditions, specifying solution parameters, and visualizing and analyzing the results.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-I Sem

	L	T/P/D	C
(R18A2188) FLIGHT VEHICLE DESIGN LAB	-	-/3/-	1.5

Objectives:

1. To learn conceptual aircraft design of a typical civil transport and fighter aircraft.
2. To use various tools (software) in flight vehicle design to meet given system requirements (performance and flying qualities).

LIST OF EXPERIMENTS:

1. Aircraft Conceptual sketching based on given system requirements. System requirements for a hypothetical transport and fighter aircraft will be formulated and given to the students.
2. Weight estimation of the fighter and transport aircraft defined in experiment number 1.
3. Estimating Wing Loading of transport and fighter aircraft identified in experiment no 1.
4. Wing design and estimation of aerodynamic (lift and Drag) and stability parameters to meet the system requirements defined in experiment number 1.
5. Design of Horizontal and vertical tail and control surfaces to meet system requirements.
6. Design of Crew and passenger cabin for the hypothetical aircraft identified in experiment no one.
7. Engine Sizing and performance estimation.
8. Design of landing gear for transport and military aircraft specified in experiment no 1.
9. Estimation of Nozzle characteristics
10. Demonstration of Hydraulic Test Rig.
11. Demonstration of Pneumatic Test Rig.
12. Estimation of flying qualities of designed aircraft in flightsimulation.

Note: Minimum 10 experiments should be conducted.

Software Required: Microsoft Excel, MATLAB/SIMULINK Programming or Equivalent software

TEXT BOOKS:

1. AIRCRAFT DESIGN: A Conceptual Approach AIAA Book ISBN:0-930403-51-7 by Daniel P Raymer
2. MATLA/SIMULINK Users' Guide.

Outcomes:

1. Student will be able to develop preliminary design of a given aircraft (transport and fighter aircraft) to meet given performance requirements.
2. Able to use various software tools in design & analysis of aircraft.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A2120) AIRCRAFT MAINTENANCE ENGINEERING

Objectives:

- To introduce the knowledge of the maintenance and repair procedures followed for overhaul of aero engines.
- To impart the standards of FAA for documentation.

UNIT – I

NECESAITY & DEVELOPMENT OF MAINTENANCE PROGRAMS

Definition of maintenance, role of the engineer, role of the mechanic, two types of maintenance, reliability, establishing a maintenance program. Goals and objectives of maintenance. Maintenance steering group(MSG) Approach, process – Oriented maintenance, task- oriented maintenance, current MSG process – MSG – 3, maintenance program documents.

UNIT – II

AVIATION CERTIFICATION REQUIREMENTS AND DOCUMENTATION FOR MAINTENANCE & ENGINEERING

Aircraft certification, delivery inspection, operator certification, certification of personnel, aviation industry interaction; types of documentation. Manufacturer`s documentation, regulatory documentation. Airline generated documentation. ATA document standards. Objectives of a maintenance program, outline of aviation maintenance program, summary of FAA requirements, additional maintenance program requirements; organization of maintenance and engineering, organization structure, M&E organization chart, general groupings, managerial level functions- technical services, aircraft maintence, overhaul shops, material.

UNIT – III

TECHNICAL SERVICES

Engineering: makeup of engineering, mechanics and engineers, engineering department functions, engineering order preparation; production planning & control – forecasting, production planning, production control , Organization of PP&C; technical publications- functions of technical publications, airline libraries, control of publications,; Technical Training-organization, training for aviation maintenance, airframe manufacturer`s training courses,

UNIT – IV

MAINTENANCE AND MATERIAL SUPPORT

Line maintenance(on – aircraft), functions that control maintenance, MCC responsibilities, general line maintenance operations, aircraft logbook, ramp and terminal operations, maintenance crew requirement, morning meeting; Hangar Maintenance (on-aircraft)-organization of hangar maintenance, problem areas in hangar maintenance, maintenance support shops, ground support equipment, typical C – check: Shop data collection; Material support –organization and function of material. Material directorate, M&E support functions

UNIT – V

OVERSIGHT FUNCTIONS, ART & SCIENCE OF TROUBLE SHOOTING

Quality Assurance , quality audits, ISO 9000 quality standard, technical records, Quality control-quality control organization, FAA and JAA QC inspector qualifications. Basic inspection policies,; Reliability – definition and types of reliability, elements of a reliability program, Maintenance safety – safety regulations, maintenance safety program, general safety rules, accident and injury reporting . Human factors in maintenance, Trouble shooting, knowledge of malfunctions, Basic concepts of trouble shooting.

Text Books:

1. Kinnison, H.A , Aviation Maintenance Manageent, Mc Graw – Hill – 2004.
2. Mc Kinley, J.L. Bent, R.D ., Maintenance and Repair of Aerospace Vehicles, Northrop Institute of Technology, Mc Graw Hill, 1967.

Reference Books:

1. Friend, C.H., Aircraft maintence Management . Longman, 1992.
2. Kroes, M., Watkins. W., and Delp. F. Aircraft Maintenance and Repair, Tata Mc Graw – Hill. 2010

Outcomes:

- Ability to maintain and repair the areo engines.
- Ability to prepare aircraft maintenance manuals.
- Ability to know the standards of quality, FAA

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A2139) HELICOPTER AERODYNAMICS
(PROFESSIONAL ELECTIVE - IV)

Objectives:

- To understand the basic concepts of Helicopter flying, different configurations
- To understand the difference between Aircraft and Helicopter principles, mechanisms
- To understand the principles, theories and stability and control pertaining to it

UNIT I

INTRODUCTION.

Historical Development of Helicopters, Helicopter Configuration, Control Requirements, Types of Rotor Systems, Basic Power Requirements.

UNIT II

INTRODUCTION TO HOVERING THEORY.

Momentum Theory, Blade Element Theory, Combined Blade Element and Momentum theories for non-uniform inflow calculation, Ideal Rotor vs. Optimum Rotor.

UNIT III

VERTICAL FLIGHT.

Various flow states of Rotor, Autorotation in Vertical Descent, Ground Flight.

UNIT IV

FORWARD FLIGHT.

Momentum Theory, Variable Inflow Models, Blade Element Theory, Rotor Reference Planes, Hub Loads, Power variation with forward speed, Rotor Blade flapping Motion: Simple Model.

UNIT V

HELICOPTER TRIM AND STABILITY.

Equilibrium condition of helicopter, Trim analysis, Basics of helicopter stability.

Text Books:

1. Gessow.A and Meyers G.C. Aerodynamics of Helicopter,Macmillan& co ., N.Y.1987
2. Johnson W Helicopter theory, Princeton University pres 1980
3. MccormickB.W.Aerodynamics,Aeronautics& Flight mechanics ,John Wiley ,1995
4. Gupta. L Helicopter Engineering, Himalayan Books 1996
5. Bramwell A.R.S Helicopter Dynamics Edward Arnold Publications London 1976
6. Stepniewski W.Z Rotary Rotary wing Aerodynamics Vol 1 & 2 Dover publications 1984

Outcomes:

- The student will be able to identify the key differences between Aircraft and Helicopter
- The analyze the basic concepts, theories regarding forward and hovering Flight
- The significance of Stability and Control in different conditions

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem	L	T/P/D	C
(R18A2140) ADVANCED COMPUTATIONAL AERODYNAMICS (PROFESSIONAL ELECTIVE - IV)	3	-/-/-	3

Objectives:

- Application of panel methods to find aerodynamic characteristics of flow over geometries.
- Understand method of characteristics governing aerodynamic flows.
- Numerical methods to solve fluid flow problems

UNIT - I

PANEL METHODS

Introduction to panel method, Basic aspects of uniform source and vortex flows, Source panel method – Non-lifting flows over arbitrary two-dimensional bodies. Vortex panel method – Lifting flows over arbitrary two-dimensional bodies.

UNIT – II

METHOD OF CHARACTERISTICS

Introduction to numerical techniques for steady supersonic flows, Philosophy of method of characteristics. Determination of characteristic lines – Two-dimensional irrotational flow. Determination of the compatibility equation and unit processes. Regions of influence and Domains of dependence.

UNIT – III

TRANSONIC RELAXATION METHOD

Theoretical aspects of transonic flows, Small Perturbation flows - Transonic small perturbation equations - Central and Backward difference schemes, Shock capturing vs. shock fitting techniques: Conservation vs. non conservation forms of governing equations, Line relaxation techniques.

UNIT - IV

BOUNDARY LAYER EQUATION

Introduction to boundary layer equations and their solutions. Description of the boundary layer equations. Transformation of boundary layer equations and the numerical solution method. Choice of discretization model and the generalized Crank- Nicholson Scheme. Discretization of boundary layer equations and illustration of solutions of a tridiagonal system of linear algebraic equations.

UNIT - V

TIME DEPENDENT METHODS

Stability of Solution, Explicit time dependent methods - Euler, Backward Euler, One step trapezoidal, Backward differencing, methods, Leap Frog method.

Text Books:

1. John .D. Anderson "Computational Fluid Dynamics", McGraw Hill
2. Anderson, Dale A., John C. Tanhill and Richard H.P Letcher, "Computational Fluid Mechanics and Heat transfer", McGraw Hill, New York 1984, Volumes I & II.

Reference Books:

1. Hoffmann, K.A: Computational Fluid Dynamics for Engineers, Engineering Education System, Austin, Tex., 1989
2. Kreyszig, E., Advanced Engineering Mathematics, Wiley, New York
3. Introduction to Computational Fluid Dynamics, Chow CY, John Wiley, 1979
4. Bose, T.K., Computation Fluid Dynamics, Wiley Eastern Ltd., 1988.

Outcomes:

- Solve differential equations governing fluid flow problems.
- CFD Techniques for boundary layer problems.
- Application of Time dependent techniques for transient aerospace problems.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R187A2141) ANALYSIS OF COMPOSITE STRUCTURE (PROFESSIONAL ELECTIVE - IV)	**3**	**-/-/-**	**3**

UNIT-I

Properties of Constituent Materials and Composite Laminates: Introduction to laminated composite plates, Mechanical Properties of constituent materials such as Matrix and Filaments of different types.

Netting analysis of composite materials, determination of properties of laminates with fibers and matrices.

UNIT-II

Stress-Strain relations of Isotropic, Orthotropic and Anisotropic materials, transformation of material properties for arbitrary orientation of fibers.

UNIT-III

Methods of Analysis: Mechanics of materials approach to determine Young‘s modulus, Shear Modulus and Poisson‘s ratio, brief mention of elasticity approach and Macro mechanics of laminates

Anisotropic elasticity, stress –strain relations in material coordinates - Transformation of geometric axes, strength concepts, Biaxial strength theories, Maximum stress and Maximum strain.

UNIT-IV

Analysis of laminated plates: Classical plate theory, Classical lamination theory – Special cases of single layer, symmetric, anti-symmetric & unsymmetric composites with cross ply, angle ply layup. Deflection analysis of laminated plates, Analysis laminated beam and plates.

UNIT-V

Shear deformation theories for composite laminated beams, plates-first, second and third order theories, nth Order theory.

Buckling analysis of laminated composite plates with different orientation of fibers, Tsai-wu criteria and Tsai – Hill Criteria.

Text Books

1. Agarwal B. D., Broutman. L. J., *Analysis and performance of fiber composites,* John wiley and sons-New York, 1980.

2. Lubin. G, *Hand Book on Advanced Plastics and Fiber Glass,* Von. Nostrand*,* Reinhold Co. New York, 1989.

REFERENCES

1. Gupta, L., *Advanced composite Materials,* Himalayan Books, New Delhi,1998.
2. Jones, R. M., *Mechanics of Composite Materials,* McGrawHill, Kogakusha, ltd. Tokyo.
3. Reddy J.N., Mechanics of Composite Materials.

Outcome: The students will be able to select appropriate composite materials and analyzes for different elastic properties by using various methods.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R187A2142) AIRLINE AND AIRPORT MANAGEMENT (PROFESSIONAL ELECTIVE – V)

Objectives:

To understand and acquire a sound understanding on basic management aspect of airport and airlines system such as airports layout, air traffic control, landing procedure, scheduling, flight planning and other economic and commercial activities.

UNIT I

AIRPORTS AND AIRPORT SYSTEMS

Introduction-Airport Management on an international level- Rules that govern airport management-Organization and administration Airport ownership and organization , responsibilities of Airport manager .Components of an airport-The airfield-Navigation aids(NAVAIDS)located on airfields-Air traffic Control and surveillance facilities located on the airfield.

UNIT II

AIRPORT OPERATIONS MANAGEMENT: Airspace and air traffic management, Airport operations management under FAR Part 139, Airport terminals and ground access, Airport security and Administration -Security at commercial service airports-Security at general aviation airports.

UNIT III

AIRPORT ADMINISTRATION AND FINANCIAL MANAGEMENT ,CAPACITY AND DELAY

concept of Airport planning and financial accounting-Revenue strategies at commercial airports-Pricing of airport facilities and services, , The future of airport management.

Defining capacity-Factors affecting capacity and delay-estimating capacity-Simulation Models-Defining delay-Estimating delay-Analytical estimates of delay.

UNIT IV

INTRODUCTION TO AIRLINE PLANNING: Structure of Airline Industry (Domestic & International)-Growth and Regulation-Deregulation-Major and National Carriers-Regional Carriers-Economic characteristics of the Airlines Airline Planning Process-Airline Terminology and Measures: airline demand, airline supply, average load factor, unit revenue, Airline Planning Decisions

UNIT-V

FLEET PLANNING AND ROUTE EVALUATION: Factors in Fleet Planning-Hub-and-Spoke System-Technical Aspects-Fleet Rationalization-Fleet Commonality-Long Range Aircraft-Noise Restrictions-Factors in Design and Development-Fleet Planning Process; Route Evaluation in Hub Networks-Route profitability estimation issues-Demand Driven Dispatch.

Text Books

1. Airport Planning and Management 6/E 0006 Edition by Young Seth, Mc GRAW Hills.
2. Airport Management by Ravindran P.C.K, Asian Law House.
3. Air Transportation: A Management Perspective (Fifth Edition) by Alexander T.Wells and John G.Wensveen, Brooks Cole,2003

REFERENCE BOOKS

1. Airport Systems: Planning, Design and Management by Rechard De Neufville Tata Mc Graw Hills.
2. Airline Marketing and Management by Stephen Shaw, Ashgate Publishing, 2004
3. Airline Management, by Peter P BelobabaMIT Open Courseware Lecture Notes, 2006

Outcomes:

- The student can get an broad overview and functioning of the airline industry. It focuses on the underlying marketing, financial, operational and competitive factors that influence airline viability.
- The student can investigate how the sensitivity of airline profitability impacts airline management decisions and analyze the principles of airline economics, costs and pricing.
- The student and assess the individual characteristics of low-cost carriers and business only airlines.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem

	L	T/P/D	C
(R187A2143) AEROELASTICITY (PROFESSIONAL ELECTIVE - V)	**3**	**-/-/-**	**3**

Objectives:

The course should enable the students to:

- To elucidate the aero elastic Phenomena and formulations
- Find solution techniques for aerospace vehicles in flight and to incorporate the spin off benefits.
- Understand the application of aero elasticity and its effect on aircraft components.

UNIT-I INTRODUCTION TO AEROELASTICITY

Definition and historical background, Static and dynamic aeroelastic phenomenon, integretion of aerodynamic, elastic and inertia forces, influence of aeroelstic phenomenon on air craft design, Comparison of critical speeds.

UNIT-II DIVERGENCE OF LIFTING SURFACE

The phenomenon of divergence, divergence of 2-D wing section, divergence of an idealized cantilever wing, solution based on semi-rigid assumptions, solution to generalized co-ordinates Method of successive approximation, use of Numerical Methods.

UNIT-III STEADY STATE AERO-ELASTICITY PROBLEMS IN GENERAL

Loss and reversal of aileron Control: 2D case, aileron reversal general case. Lift distribution on a rigid and elastic wing. Effect on Static Longitudinal stability of airplane.

UNIT-IV INTRODUCTION TO FLUTTER AND BUFFETING

The phenomenon of flutter, flutter of a cantilever wing. Approximate determination of critical speed by Galerkin's Method, buffeting and stall flutter.

UNIT-V NON AERONAUTICAL PROBLEMS

Some typical example in civil engineering, Flow around an oscillating circular cylinder applications to H-shaped sections, Prevention of aero-elastic instabilities.

Text Books:

1. Fung Y.C. an introduction to the Theory of Aeroelasticity John Wiley and Sons, New York, 1985.
2. Bisphlinghoft R. C. Ashlay. H and Halfmam. R Aero-elasticity – Addition Werley Publishing Company.

3. Scnlan R.H. and Rosenbaum. R Introduction to the study of Aircraft Vibrations and Flutter McGraw Company New York 1981.

Reference Books:

Bisphlinghoft R. C. and Ashely, Principles of Aeroelasticity Johnwiley Company. 1998.

Outcomes:

The student should be able to:

- Understand the formation of Aileron reversal, flutter and wing divergence.
- Control aero elastic problems on fight stability and control.
- Application Aero elastic theories to Non aeronautical problems.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ANE-II Sem

L	T/P/D	C
3	-/-/-	3

(R187A2144) HYPERSONIC AERODYNAMICS (PROFESSIONAL ELECTIVE - V)

Objectives:

The course should enable the students to:

- Formulate and apply appropriate aerodynamic models to predict the forces on and performance of realistic three-dimensional configurations in hypersonic flows.
- Understand about current aerospace problems like Aerodynamic heating.
- Know about experimental methods for hypersonic flows.

UNIT-I - FUNDAMENTALS OF HYPERSONIC FLOWS AND APPROXIMATIONS

Importance/properties of hypersonic flow-Basic equations boundary conditions for inviscid flow, concept of equilibrium and nonequilibrium flows, transport properties. Basic conservation equations and species continuity equation, hypersonic shock and expansion relations, hypersonic similarity parameters. Newtonian, modified Newtonian.

UNIT-II - HYPERSONIC SMALL DISTURBANCE THEORY

Flow over a wedge and a cone- Blast wave analogy,-Newtonian impact theory- Busemann centrifugal correction -Shock expansion method- Tangent cone and tangent wedge methods Pressure distribution in separated regions and in reacting flows.

UNIT-III - BASIC ASPECTS OF HYPERSONIC VISCOUS FLOWS AND AERODYNAMIC HEATING

Introduction to viscous flow and pressure interactions over flat plate- Boundary layers Reference temperature method-Entropy layer effects on aerodynamic heating.

UNIT-IV - HYPERSONIC VEHICLE DESIGN

Supersonic Inlet design Strong and weak interactions-Shock wave/ boundary layer interactions
Concept of SERN, Design aspects of various Hypersonic vehicles like X-43, HSTDV, Hyshot

UNIT-V - EXPERIMENTAL METHODS FOR HYPERSONIC FLOWS:

Arc Jet facilities, Impulse facilities, hypersonic wind tunnels, shock tunnels, gun tunnels, freepiston shock tunnels, expansion tubes etc. Flow visualization techniques, model testing.

Text Books

1. “Hypersonic and High Temperature Gas Dynamics”, Anderson, J.D,McGraw-Hill, 1989.
2. “Hypersonic Aerothermodynamics”, Bertin, J.J., AIAA, 1994.

Reference Books:

1. “Introduction to Hypersonic flow”, Cherni C G, Academic Press,1961
2. “Hypersonic Flow Theory”, Hayes W D and Problein R F, Academic Press 1959
3. “Elements of Hypersonic Aerodynamics”, Cox R N and Crabtree L P, London 1965

Outcomes:

The student should be able to

- Estimation of aerodynamic characteristics of different geometries in hypersonic conditions.
- Application aerodynamic theories in the design hypersonic vehicles.
- Validation of experimental results with analytical results.



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: met2004@gmail.com, website: ww.mrcet.ac.in

BACHELOR OF TECHNOLOGY
COMPUTER SCIENCE AND ENGINEERING

Course Structure and Syllabus
(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ”Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous CollegeStatutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promotingexcellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for TechnicalEducation.
- “University” the Jawaharlal Nehru Technological University,Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by thecontext.
- “Program”means:
  - Bachelor of Technology (B.Tech) degreeprogram
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineeringetc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in asemester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory,C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but underits observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates tothesociety.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modernsociety.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International PioneeringOrganizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart qualityeducation.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year afteryear.

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

COURSE STRUCTURE

I B. Tech (CSE) – I Semester (I Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0001	English	2	0	0	2	30	70
2	R18A0021	Mathematics – I	4	1	0	4	30	70
3	R18A0013	Applied Physics	3	0	0	3	30	70
4	R18A0302	Engineering Graphics	1	0	4	3	30	70
5	R18A0501	Programming for Problem Solving	3	0	0	3	30	70
6	R18A0082	Engineering/IT Workshop	-	0	4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-	0	3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-	0	3	1.5	30	70
		TOTAL	**13**	**1**	**14**	**20**	**240**	**560**

I B. Tech (CSE) – I Semester (I Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0002	Professional English	2	0	0	2	30	70
2	R18A0022	Mathematics – II	4	1	0	4	30	70
3	R18A0012	Engineering Chemistry	3	0	0	3	30	70
4	R18A0502	Object Oriented Programming	3	0	0	3	30	70
5	R18A0201	Basic Electrical Engineering	3	0	0	3	30	70
6	R18A0083	Engineering Physics/Chemistry Lab	-	0	4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-	0	3	1.5	30	70
8	R18A0281	Basic Electrical Engineering Lab	-	0	3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2	-	-	0	100	-
		TOTAL	**17**	**1**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II B. Tech (CSE) – III Semester (II Year ISemester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0503	Data Structures	3	0	0	3	30	70
2	R18A0461	Analog and Digital Electronics	3	0	0	3	30	70
3	R18A0504	Operating Systems	3	0	0	3	30	70
4	R18A0024	Probability and Statistics	3	0	0	3	30	70
5	R18A0505	Computer Organization	3	0	0	3	30	70
6	R18A0506	Discrete Mathematics	3	0	0	3	30	70
7	R18A0583	Operating Systems Lab	-	0	3	1.5	30	70
8	R18A0584	Data Structures Lab	-	0	3	1.5	30	70
9	R18A0004	Foreign Language: French	2	-	-	0	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II B. Tech (CSE) – IV Semester (II Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0507	Design and Analysis of Algorithms	3	0	0	3	30	70
2	R18A0508	Formal Language and Automata Theory	3	0	0	3	30	70
3	R18A0509	Java Programming	3	0	0	3	30	70
4	R18A0510	Database Management Systems	3	0	0	3	30	70
5	R18A0061	Managerial Economics and Financial Analysis	3	0	0	3	30	70
6	****	Open Elective-I	3	0	0	3	30	70
7	R18A0585	Java Programming Lab	0	0	3	1.5	30	70
8	R18A0586	Database Management Systems Lab	0	0	3	1.5	30	70
9	R18A0014	Environmental Science	2	-	-	0	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B. Tech – V Semester (III Year ISemester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0511	Software Engineering	3	0	0	3	30	70
2	R18A0512	Compiler Design	3	0	0	3	30	70
3	R18A0464	Embedded Systems	3	0	0	3	30	70
4	R18A0513	Python Programming	3	0	0	3	30	70
5	R18A1205 R18A0515 R18A0516	Professional Elective-I 1. Artificial Intelligence 2. PervasiveComputing 3. Information Security	3	0	0	3	30	70
6	******	Open Elective-II	3	0	0	3	30	70
7	R18A0587	Compiler Design Lab	0	0	3	1.5	30	70
8	R18A0588	Python Programming Lab	0	0	3	1.5	30	70
9	R18A0006	Technical Communication & Soft Skills	2	-	-	0	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B. Tech – VI Semester (III Year II Semester)

S.NO	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0517	Web Technologies	3	0	0	3	30	70
2	R18A1207	Mobile Application Development	3	0	0	3	30	70
3	R18A0518	Computer Networks	3	0	0	3	30	70
4	R18A0592	Mini Project	-	-	6	3	30	70
5	R18A0519 R18A0520 R18A0521	Professional Elective-II 1. Computer Graphics 2. DistributedSystems 3. Cyber Security	3	0	0	3	30	70
6	*******	Open Elective-III	3	0	0	3	30	70
7	R18A0589	Web Technologies Lab	0	0	3	1.5	30	70
8	R18A1282	Mobile Application Development Lab	0	0	3	1.5	30	70
9	R18A0007	Indian Constitution	2	-	-	0	100	-
		TOTAL	**17**	**0**	**12**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

IV Year B. Tech – VII Semester (IV Year ISemester)

S.NO	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0522	Software Testing Methodologies	3	0	0	3	30	70
2	R18A0523	Cloud Computing	3	0	0	3	30	70
3	R18A0524	Data Warehousing and Data Mining	3	0	0	3	30	70
4	R18A0525	Linux Programming	3	0	0	3	30	70
5	R18A0526 R18A0527 R18A0528	Professional Elective-III 1. MachineLearning 2. MobileComputing 3. Service OrientedArchitecture	3	0	0	3	30	70
6	R18A0593	Project-I	-	-	6	3	30	70
7	R18A0590	Linux Programming Lab	-	-	3	1.5	30	70
8	R18A0591	Software Testing Methodologies Lab	-	-	3	1.5	30	70
		TOTAL	**15**	**0**	**12**	**21**	**240**	**560**

IV Year B. Tech – VIII Semester (IV Year II Semester)

S.NO		SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0529	Big Data Analytics	3	0	0	3	30	70
2	R18A0530 R18A0531 R18A0532	Professional Elective-IV 1. Parallel and Distributedcomputing 2. Internet ofThings 3. AdvancedAlgorithms	3	0	0	3	30	70
3	R18A0533 R18A0534 R18A0535	Professional Elective-V 1. Soft Computing 2. Block ChainTechnology 3. ImageProcessing	3	0	0	3	30	70
4	R18A0594	Project-II	-	-	12	6	60	140
		TOTAL	**9**	**0**	**12**	**15**	**150**	**350**

OPEN ELECTIVE 1

S.NO.	SUBJECT CODE	SUBJECT
1	R18A0451	DIGITAL ELECTRONICS
2	R18A0551	DATA BASE SYSTEMS
3	R18A0553	DATA STRUCTURES USING PYTHON
4	R18A0351	INTELLECTUAL PROPERTY RIGHTS
5	R18A0352	GREEN ENERGY SYSTEMS
6	R18A0555	DATA VISUALIZATION

OPEN ELECTIVE 2

S.NO.	**SUBJECT CODE**	**SUBJECT**
1	R18A1253	MANAGEMENT INFORMATION SYSTEMS
2	R18A0552	INTRODUCTION TO JAVA PROGRAMMING
3	R18A1252	SOFTWARE PROJECT MANAGEMENT
4	R18A0353	ENTERPRISE RESOURCE PLANNING
5	R18A0354	NANO TECHNOLOGY

OPEN ELECTIVE 3

S.NO.	**SUBJECT CODE**	**SUBJECT**
1	R18A0452	ROBOTICS & AUTOMATION
2	R18A0453	INTERNET OF THINGS & ITS APPLICATIONS
3	R18A1253	SOFTWARE TESTING TECHNIQUES
4	R18A0355	TOTAL QUALITY MANAGEMENT
5	R18A0251	ELECTRICAL SYSTEMS & APPLICATIONS
6	R18A0554	OPERATING SYSTEM CONCEPTS

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I-SEM-CSE **L T/P/D/C**
2 - / - / - /2

(R18A0001) ENGLISH

INTRODUCTION:

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected act as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designedsyllabus.
3. To familiarize students with the principles of writing to ensure error-freewriting.
4. To know to use sentence structure effectively and to understand how to convert ideas logically within asentence.
5. To expose students to various techniques of reading skills which hone their comprehensiveskills.

SYLLABUS:

Unit –I

Chapter entitled "***The Road Not Taken****" by*Robert Frost (8 hrs)
Grammar –Tenses and Punctuation (Sequences ofTenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading – Techniques for effective reading-Reading Exercise –Type 1

Unit –II

Chapter entitled "***Abraham Lincoln's Letter to HisSon'sTeacher***" (7hrs)
Grammar – Voices, Transitive and Intransitive Verbs
Vocabulary – Synonyms,Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Skimming, scanning- Reading Exercise –Type2

Unit – III

Chapter entitled "***War***" byL.Pirandello (6 hrs)

Grammar –Degrees of Comparison,Prepositions

Vocabulary – Phrasal Verbs

Writing – Essay Writing (Introduction, body and conclusion)

Reading – Comprehension- Reading Exercise – Type3

Unit – IV

Chapter entitled "***J K Rowling'sHarvardSpeech***" (6 hrs)

Grammar – Articles, MisplacedModifiers

Vocabulary – One-Word Substitutes

Writing – PrécisWriting

Reading – Intensive and Extensive reading - Reading Exercise – Type4

Unit –V

Sentence Structures (phrasesand clauses) (7 hrs)

Grammar – Subject-Verb Agreement, Noun-PronounAgreement

Vocabulary – Commonly Confused Words

Writing – MemoWriting

Reading – Identifying Errors - Reading Exercise – Type5

* Exercises apart from the text book shall also be used for classroom tasks.

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book.2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford UniversityPress

OUTCOMES:

Students will be able to:

1. write formal or informal letters and applications for differentpurposes.
2. select and extract relevant information through skimming andscanning.
3. utilize the strategy of brainstorming in preparing analytical, argumentative and expositoryessays.
4. draft concise emails following professionalemailetiquette.
5. enhance their grammatical competency byspottingerrors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I-SEM–CSE **L T/P/DC**

4 1/-/- 4

(R18A0021) MATHEMATICS -I

Course Objectives: To learn

1. The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the eigen vectors of a givenmatrix.
2. Finding maxima and minima of functions of severalvariables.
3. Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth anddecay)
4. How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
5. Solving differential equations using LaplaceTransforms.

UNIT I: Matrices

Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:Functions of Several Variables

Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for twovariables.

UNIT III: Ordinary Differential Equations

First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV: Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear

equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t", Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGrawHill.

ii) Higher Engineering Mathematics by B.S. Grewal, KhannaPublishers.

iii) Advanced Engineering Mathematics by Kreyszig, John Wiley &Sons.

REFERENCE BOOKS:

i) Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.

ii)Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .

iii)Engineering Mathematics by N.P Bali and ManishGoyal.

Course Outcomes: After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of amatrix.
2. Find the extreme values of functions of two variables with / withoutconstraints.
3. Solve first and higher order differential equations.
4. Solve first order linear and non-linear partial differentialequations.
5. Solve differential equations with initial conditions using LaplaceTransform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH – I YEAR – I SEM-CSE **L T/P/DC**
3 -/-/- 3

(R18A0011) APPLIED PHYSICS

COURSE OBJECTIVES:

1. To understand dual nature of the matter and behavior of a particle quantum mechanically.
2. To understand band structure of the solids and classification ofmaterials.
3. To be able to distinguish pure, impure semiconductors and characteristics of PN junction diode.
4. To understand dielectric and magnetic properties of the materials and enable them to design and apply in differentfields.
5. To be able to distinguish ordinary light with a laser light and realize the transfer of light through opticalfibers.

UNIT – I

QUANTUMMECHANICS (7Hours)

Wave nature of particles, deBroglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – II

ELECTRONIC MATERIALS (7Hours)

Free electron theory, Fermi level, Density of states, Periodic potential-Bloch's theorem, Kronig – Penny modal, E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials on the basis of energy bands: Metals, semi conductors and insulators.

UNIT – III

SEMICONDUCTORPHYSICS (7 Hours)

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semi conductors, Carrier concentration in intrinsic and extrinsic semi conductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT-IV

DIELECTRICS AND MAGNETIC PROPERTIESOF MATERIALS (10 Hours)

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT–V: (9Hours)

LASERS & FIBER OPTICS

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, types of pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Attenuation, Optical Fiber in Communication System, Applications ofoptical fibers.

COURSE OUTCOMES*:* After completion of studying Applied Physics the student is able to,

1. Know the basic principles of quantum mechanics and the importance of behavior of a particle.
2. Realize the importance of band structure of solids and their applications in various electronic devices.
3. Learn concentration estimation of charge carriers in semiconductors and working principles of PNdiode.
4. Learn dielectric, magnetic properties of the materials and apply them in material technology.
5. Learn the principles and production of LASER beams and transfer of information by optical fiber communicationsystems.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradhapublications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, DhanpatRaiPublishers.
2. Engineering Physics, S Mani Naidu- PearsonPublishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K.Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitechpublications.
5. Physics by Resnick andHaliday.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –ISEM-CSE

L	T/P/D	C
1	-/4-/ -	3

(R18A0301) ENGINEERING GRAPHICS

Course Objectives:

1. Learn to sketch and take fielddimensions.
2. Learn to take data and transform it into graphicdrawings.
3. Learn basic engineering drawingformats

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Methodonly)
b) Conic Sections (General Method only- EccentricityMethod)
c) Cycloid, Epicycloid andHypocycloid
d) Scales-Plain, Diagonal andVernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditionalproblems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditionalproblems).

UNIT – IV

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and CompoundSolids.

UNIT – V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

Course Outcomes:

1. Student's ability to convert sketches to engineered drawings willincrease.
2. Students will be able to draw orthographic projectionsandsections.
3. Student's ability to perform basic sketching techniques willimprove.

TEXT BOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers,2017.
2. Engineering Drawing, N.D.Bhatt
3. Engineering Drawing by K.VenuGopal&V.Prabu Raja New AgePublications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.ChandPublishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill BookPublishers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- CSE

L	T/P/D	C
3	-/-/-	3

(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES

1. To understand the various steps in Programdevelopment.
2. To understand the basic concepts in C ProgrammingLanguage.
3. To learn how to write modular and readable CPrograms
4. To learn to write programs (using structured programming approach) in C to solve problems.

UNIT - I

Introduction to Computing – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

Statements-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

Functions-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

Arrays- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

Strings- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

Pointers- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

Structures- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, CengageLearning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie,PHI.
2. Computer Programming, E.Balagurusamy, First Edition,TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S.Publications.
4. Programming in *C, Ashok Kamthane*. Pearson EducationIndia.
5. Let us C ,YashwanthKanethkar, 13th Edition, BPBPublications.

COURSE OUTCOMES:

1. Demonstrate the basic knowledge of computer hardware andsoftware.
2. To formulate simple algorithms for arithmetic and logicalproblems.
3. To translate the algorithms to programs (in Clanguage).
4. To test and execute the programs and correct syntax and logicalerrors.
5. Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- CSE

L	T/P/D	C
-	-/-/ 4	2

(R18A0082)ENGINEERING WORKSHOP/ IT WORKSHOP

COURSEOBJECTIVES:

1. Student able to learn about different tools used in thelab
2. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student able to learn about different Carpentry and Fittingtools

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. BlackSmithy
5. House-wiring

2. TRADES FOR DEMONSTRATION &EXPOSURE:

1. Plumbing
2. MachineShop
3. Welding
4. Foundry
5. Metal Cutting (WaterPlasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

COURSE OUTCOMES:

1. Students can understand different machine shopoperations
2. Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student learned about metal cuttingprocesses

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I YEAR-ISEM-CSE **L T/P/D C**

- -/ 4 /-2

(R18A0082)IT WORKSHOP LAB

OBJECTIVES:

1. The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and PowerPoint
2. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would becovered.
3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would beintroduced.
4. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal websites using the Microsoft suite of officetools.
5. HTML introduction for creating static webpages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.

Header and Footer

Bullets and Numbering

Drawing Toolbar: Auto shapes, Textboxes, etc

Design Template

Introduction to custom animation.

b) Create a presentation to conduct a creativity session using the following tools:

1. Slide transition
2. Master slideview
3. Insert picture – clipart,image
4. Actionbutton
5. Drawing tool bar – lines,arrows
6. Hyperlink
7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required devicedrivers.
2. Students can detect and perform minor hardware and software leveltroubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet foracademics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite ofofficetools.
5. The students are able to create a static webpage's usingHTML.

Text Books:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.ChasePHI(Microsoft)

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B. TECH- I YEAR-ISEM-CSE **L T/P/D C**

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(R18A0581) PROGRAMMING FOR PROBLEM SOLVINGLAB

OBJECTIVES:

1. Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
2. Acquire knowledge about the basic concept of writing aprogram.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of CLanguage.
4. Use of conditional expressions and looping statements to solve problems associated with conditions andrepetitions.
5. Role of Functions involving the idea ofmodularity.
6. Programming using gcc compiler inLinux.

Week 1:

a) Write a C program to find sum and average of threenumbers.

b) Write a C program to find the sum of individual digits of a given positiveinteger.

Week 2:

a) Write a C program to generate the first n terms of the Fibonaccisequence.

b) Write a C program to generate prime numbers from 1 ton.

c) Write a C program to check whether given number is Armstrong Number ornot.

Week 3:

a) Write a C program to check whether given number is perfect number ornot.

b) Write a C program to check whether given number is strong number ornot.

Week 4:

a) Write a C program to find the roots of a quadraticequation.

b) Write a C program to perform arithmetic operations using switchstatement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursivefunction.

b) Write a C program to find factorial of a given integer using recursivefunction.

Week 6:

a) Write C program to find GCD of two integers by using recursivefunction.

b) Write C program to find GCD of two integers using non-recursivefunction.

Week 7:

a) Write a C program to find both the largest and smallest number in a list ofintegers.

b) Write a C program to Sort the Array in an AscendingOrder

c) Write a C program to find whether given matrix is symmetric ornot.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of twomatrices.

b) Write a C program that uses functions to perform multiplication of twoMatrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a givenposition.

b) Write a C program that uses functions to delete n Characters from a given position in a givenstring.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome ornot.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't containT.

Week 12:

a) Write C program to count the number of lines, words and characters in a giventext.

b) Write a C program to find the sum of integer array elements usingpointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BSPublications
2. Computer programming in C.V.RAjaraman, PHIPublishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMHPublishers.
4. C Programming, M.V.S.S.NVenkateswarlu and E.V.Prasad,S.ChandPublishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMHPublishers.

OUTCOMES:

1. Acquire knowledge about the basic concept of writing aprogram.
2. Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of CLanguage.
3. Learn how to use of conditional expressions and looping statements to solve problems associated with conditions andrepetitions.
4. Understand the Role of Functions involving the idea ofmodularity.
5. Understand the Concept of Array and pointers dealing with memorymanagement.
6. Learn Structures and unions through which derived data types can beformed.

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B. TECH- I YEAR-ISEM-CSE **L T/P/D C**
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(R18A0081)ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on phonetic knowledge of the English language and its use in everyday situations and contexts.

OBJECTIVES:

1. To expose students to a variety of self-instructional, learner-friendly modes of language learning
2. To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
3. To enable students to overcome public speaking anxiety and equip them to become employable.
4. To familiarize students with formal telephonic expressions by means of appropriate tone.
5. To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL)Lab
b. Interactive Communication Skills (ICS)Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking Activity - JAM Session- Greetings – Taking Leave – Introducing Oneself and Others.

UNIT –II

CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation
ICS Lab: Situational Dialogues/Role Plays - Making Requests and Seeking Permissions.

UNIT –III

CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)

ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. **Computer Assisted Language Learning (CALL)Lab:**

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IVProcessor
   a) Speed –2.8GHZ
   b) RAM –512 MBMinimum
   c) HardDisk –80GB

ii) Headphones of High quality

2.**Interactive Communication Skills (ICS) Lab:**

A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

DISTRIBUTION AND WEIGHTAGE OF MARKS

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practicalsessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the otherinstitution.

OUTCOMES:

Students will be able to:

1. understand the importance of learning phonetics.
2. learn how to pronounce words using phonetictranscription.
3. know the importance of speaking English with rhythm andintonation.
4. effectively participate in JAMsession.
5. use polite expressions in all formalsituations.
6. effectively communicate throughtelephone.

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B. TECH- I YEAR-IISEM-CSE **L T/P/D C**
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(R18A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interviewskills.
3. To lay foundation with writing strategies for the future workplaceneeds.
4. To acquaint students with different components of professional presentationskills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

SYLLABUS:

UNIT-I (7 hrs)
Listening - Bill Gate's TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects andPersons
Grammar - Finite and Non-finiteverbs
Vocabulary - BusinessVocabulary
Writing - ParagraphWriting

Unit –II (8 hrs)
Listening - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking - Oralpresentations
Grammar - Transformation ofSentences
Vocabulary - Idioms
Writing - AbstractWriting

Unit –III (8 hrs)
Listening - Sample Interviews (videos)
Speaking - MockInterviews
Grammar - Direct and IndirectSpeech

Vocabulary - Standard Abbreviations (MiniProject)
Writing - Job applications I (CoverLetter)

Unit –IV (6 hrs)
Listening - Telephonic Interviews
Speaking - TelephonicExpressions
Grammar - Auxiliaryverbs
Vocabulary - WordAnalogy-I
Writing - Job Application II (Resume)

Unit – V (5 hrs)
Listening - Tanmay Bhakshi's ITU interview
Speaking - ProfessionalEtiquette
Grammar - CommonErrors
Vocabulary - WordAnalogy-II
Writing - Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERNCE BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book.2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford UniversityPress

OUTCOMES:

Students will be able to:

1. draft coherent and unified paragraphs with adequate supportingdetails.
2. demonstrate problem solving skills, decision-making skills, analyticalskills.
3. comprehend and apply the pre-interview preparation techniques for successful interview.
4. achieve expertise in writing resume and cover letterformats.
5. understand the steps of writing 'Reports andAbstract'.

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B. TECH- I YEAR-IISEM-CSE **L T/P/D C**
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(R18A0022)MATHEMATICS-II

OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
2. To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differentialequations.
3. Evaluation of improper integrals using Beta and Gammafunctions.
4. Evaluation of multipleintegrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volumeintegrals.

UNIT – I: Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.
Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae. Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II: Numerical Methods

Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.
Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.
Curve fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III: Beta and Gamma functions

Introduction of improper integrals- Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V: Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGrawHill.
ii) Higher Engineering Mathematics by B.S. Grewal, KhannaPublishers.
iii) Mathematical Methods by S.R.KIyenger, R.K.Jain, NarosaPublishers.

REFERENCE BOOKS:

i) Advanced Engineering Mathematics by Kreyszig, John Wiley &Sons.
ii) Advanced Engineering Mathematics by Michael Greenberg –Pearsonpublishers.
iii) Introductory Methods of Numerical Analysis by S.S. Sastry,PHI

Course Outcomes: After learning the contents of this paper the student must be able to

1. Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discretedata.
2. Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3. Find a numerical solution for a givendifferentialequation.
4. Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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B.TECH- I- YEAR- II-SEM –CSE

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(R18A0013) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosioncontrol.
2. To analyze microscopic chemistry in terms of atomic and molecularorbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organiccompounds.
5. To analyze different types of fuels and their applications in various engineeringfields.

Unit-I: Electrochemistry and Corrosion (12 lectures)

Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

Unit -II: Atomic and Molecular Structure (8 lectures)

Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

Unit -III: Water and its Treatment (**6 lectures**)

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

Unit-IV: Organic Reactions (10 lectures)

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic addition reactions; addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

Unit-V: Energy Sources (8 lectures)

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal - proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, NewDelhi.
2. Engineering Chemistry by Prasanta Rath, B.Rama Devi, C. H. Venkata Ramana Reddy, SubhenduChakroborty, Cengage Learning Publication, India Private Limited, 2018.

Reference Books:

1. University Chemistry by B. H. Mahan, Pearson, IVEdition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati BhavanPublishers.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:

1. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineeringservice.
2. Achieve basic concepts of atomic, molecular and electronic changes related to conductivity andmagnetism.
3. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatmentplants.
4. Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
5. Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineeringapplications.

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B.T ECH- I- YEAR- II-SEM–CSE **L T/P/D C**

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(R18A0502)OBJECT ORIENTED PROGRAMMING

OBJECTIVES:

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming and procedural programming.
- To design applications using object oriented features.
- To teach the student to implement object oriented concepts.

Unit - I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures &Loops.

Functions: Introduction to functions, Inline functions, Command Line arguments.

Unit - II

Classes and Objects:

Introduction of Classes: Class Definition, Defining a Members, Objects, Access Control, Class Scope, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Friend Functions.

Constructors and Destructors:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Destructors.

Unit - III

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Pointers: Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes.

Unit - IV

Virtual Functions and Polymorphism:

Polymorphism, Compile time polymorphism: Overloading- Function Overloading, Operator overloading, Run time polymorphism, Virtual Functions.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism.

Unit -V

Templates:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Standard Template Library Classes: STL Container classes- Array class, Vector,stack,queue, STL Algorithm classes- Sort, reverse, max, min.

Application Development using C++

Text Books:

1. Object Oriented Programming with C++ by Balaguruswamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt,TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.

The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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B.TECH- I- YEAR- II-SEM–CSE **L T/P/D C**
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(R18A0201) BASIC ELECTRICAL ENGINEERING

OBJECTIVE:

1. This course introduces the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
2. The emphasis is laid on the basic elements in electricalcircuits.
3. Analysis of Circuits Which Includes Network Analysis &NetworkTheorems.
4. Analysis of Single Phase AC Circuits, Magnetic Circuits and Basic Treatment of Single Phase Transformers and DC Machines isintroduced.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,
Network Theorems**:** Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem and Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form, Complex and Polar forms of representation. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Phase and Phase difference, Concept of Power Factor, Real, Reactive and Complex power, Illustrative Problems.

UNIT–IV:

Electrical Machines (elementary treatment only):
Single phase transformers: principle of operation, constructional features and emf equation. DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations:
Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and batterybackup.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai &Sons.
3. Electrical Machines – P.S.Bimbra, KhannaPublishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learningpublications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BSpublications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw HillCompanies.
4. Electrical Machines by I.J. Nagrath& D. P. Kothari, Tata Mc Graw-HillPublishers.

OUTCOME:

At the end of this course the student would get

1. A thorough knowledge of the basic RLC circuitelements
2. Understanding of the basic concepts of networks and circuits withRLC
3. Concepts of single phase ACcircuits
4. Network theorems and their application to solve problems in Networkanalysis
5. Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

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B.TECH- I YEAR – II- SEM-CSE **L T/P/D C**
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(R18A0083) ENGINEERING PHYSICS/ CHEMISTRY LAB

(Any 8 experiments compulsory)

OBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics andelectronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physicslab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of givenwire.
2. Melde's experiment –Transverse and Longitudinalmodes.
3. Stewart and Gee's method- Magnetic field along the axis of current carryingcoil.
4. Spectrometer-Dispersive power of the material of aprism
5. Diffraction grating-using laser -Wave length oflight.
6. Newton's Rings –Radius of curvature of Plano convexlens.
7. C-R circuit – Time Constant of RCcircuit
8. Characteristics ofLED.
9. Characteristics of a Solarcell.
10. Evaluation of numerical aperture of opticalfiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**,V.G.S.publications.
2. Engineering physics practical lab manual–**MRCET.**

OUTCOMES

1. The students learn the concepts of error, analyze and try to formulate new solutions to the problems related to engineeringphysics.
2. B.Tech students basically learning the mechanical behavior of the wire and practically determiningtheelasticconstant.Transverseandlongitudinalwavesarepractically

studied. Variation of the magnetic fields along with terrestrial magnetism is practically studied.

3. Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determinedexperimentally.
4. Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practicallystudied.
5. The students learn experimental skills to design new experiments suitable for requirements in different fields(industrial, medical, scientific fieldsetc.)

R18A0083) ENGINEERING CHEMISTRY LAB

(Any Eight Experiment Compulsory)

OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

1. Provide the students with a solid foundation in chemistry laboratory required to solve engineeringproblems.
2. Practical implementation of fundamentalconcepts.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in chemistrylab.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTAmethod.

Instrumental Methods:

Colorimetry:

2. Determination of Ferrous iron in cement by Colorimetricmethod
3. Estimation of Copper by Colorimetricmethod.

Conductometry:

4. Estimation of HCl by Conductometrictitrations.
5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:

6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using$KMnO_4$.

Preparation:

8. Preparation ofAspirin.

Physical properties:

9. Determination of Viscosity of sample oil by Redwood Viscometer.

10. Determination of Surface Tension of a given liquid byStalagmometer.

Text Book:

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S.Dara

Suggested Readings:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications,Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books PrivateLtd.

OUTCOMES: At the end of the course students will be able to

1. Estimate the total hardness present in a sample ofwater.
2. Select lubricants for various purposes and determine the surface tension of a given liquid.
3. Prepare synthetic drugmolecule.
4. Determine the strength of an acid by conductometric and potentiometricmethods.
5. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

Objectives:

1. To strengthen problem solving ability by using the characteristics of an object-oriented approach.
2. To design applications using object orientedfeatures
3. To handle Exceptions in programs.
4. To teach the student to implement object orientedconcepts

Week 1:

Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positiveinteger.
b) Write a C++ program to generate the first n terms of thesequence.

Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by theuser.
b) Write a C++ program to find both the largest and smallest number in a list ofintegers.

Week 4:

a) Write a C++ program to sort a list of numbers in ascendingorder.
b) Write a Program to illustrate New and Delete Keywords for dynamic memoryallocation

Week 5

a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.

b) Program to illustrate default constructor, parameterized constructor and copy constructors

c) Write a Program to Implement a Class STUDENT having FollowingMembers:

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)OperatorOverloading.ii) FunctionOverloading.

b) Write a Program to Demonstrate Friend Function and FriendClass.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.

b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.

d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

a) Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchicalinheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base ClassPointer.

Week 12

a) Write a Template Based Program to Sort the Given List ofElements.

b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascendingorder.

Week 13

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle itProperly.
b) Write a Program to Demonstrate the Catching of AllExceptions.

Week 14

Revision

Text Books:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt,TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, PearsonEducation.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, PearsonEducation.

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(R18A0281) BASIC ELECTRICAL ENGINEERING LAB

OBJECTIVES:

1. To Design ElectricalSystems.
2. To Analyze A Given Network By Applying Various NetworkTheorems.
3. To Expose The Students To The Operation Of DC Generator
4. To Expose The Students To The Operation Of DC Motor andTransformer.
5. To Examine The Self Excitation In DCGenerators.

CYCLE –I

1. Verification of KVL andKCL.
2. Verification of Thevenin'stheorem.
3. Verification of Norton'stheorem.
4. Verification of Superpositiontheorem.
5. Verification of Maximum power transfertheorem.
6. Verification of Reciprocitytheorem.

CYCLE-II

7. Magnetization characteristics of DC shuntgenerator.
8. Swinburne's test on DC shuntmachine.
9. Brake test on DC shuntmotor.
10. OC & SC tests on single phasetransformer.
11. Load test on single phasetransformer.

NOTE: Any 10 of Above Experiments Are To Be Conducted

OUTCOMES:

After successfully studying this course, students will:

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DCMachines
3. Acknowledge the principles of operation and the main features of electric machines and theirapplications.
4. Acquire skills in using electrical measuringdevices.

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(R18A0003)HUMAN VALUES AND SOCIETAL PERSPECTIVE
(Mandatory Course)

INTRODUCTION:

Human values are the virtues that guide us to take into account human element when one interacts with other human beings. It's both what we expect others to do for us and what we aim to give to other human beings. These human values give the effect of bonding, comforting andreassuring.

OBJECTIVES:

This introductory course input is intended:

1. to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all humanbeings.
2. to facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a naturalway.
3. to highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction withNature.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha) - from family to worldfamily!

UNIT - IV:

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal humanorder.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.

c. Ability to identify and develop appropriate technologies and management patterns for above productionsystems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rdEdition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins,USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond &Briggs,Britain.
3. A Nagraj, 1998 Jeevan Vidya ekParichay, Divya Path Sansthan,Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986,1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, CommonwealthPublishers.
6. A. N. Tripathy, 2003, Human Values, New Age InternationalPublishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh,Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, UniverseBooks.
9. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford UniversityPress.
10. M Govindrajan, S Natrajan& V. S Senthil kumar, Engineering Ethics (includingHumna Values), Eastern Economy Edition, Prentice Hall of IndiaLtd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website,http://www.uptu.ac.in
2. Story of Stuff,http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics,USA
4. Charle Chaplin, Modern Times, United Artists,USA
5. IIT Delhi, Modern Technology - the UntoldStory

OUTCOMES:

1. The students will be able to obtain happiness and prosperity in theirlife.
2. They will develop harmony at alllevels.
3. They can have satisfying human behavior throughout theirlife.

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(R18A0503) DATA STRUCTURES

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

- To impart the basic concepts of datastructures
- Exploring basic data structures such as stacks queues andlists.
- Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.
- To understand concepts about searching and sortingtechniques

UNIT-I

Introduction: Abstract data types, **Singly linked list**: Definition, operations: Traversing, Searching, Insertion and deletion, **Doubly linked list**: Definition, operations: Traversing, Searching, Insertion and deletion, **Circular Linked List**: Definition, operations: Traversing, Searching, Insertion and deletion.

UNIT-II

Stack: Stack ADT, array and linked list implementation, Applications- expression conversion and evaluation. **Queue:** Types of Queue: Simple Queue, Circular Queue, Queue ADT- array and linked list implementation. Priority Queue, heaps.

UNIT-III

Searching: Linear and binary search methods. **Sorting:** Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort. Time Complexities .**Graphs:** Basic terminology, representation of graphs, graph traversal methods DFS, BFS.

UNIT IV

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. **Hash Table Representation:** hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT-V

Binary Search Trees: Various Binary tree representation, definition, BST ADT, Implementation, Operations- Searching, Insertion and Deletion, Binary tree traversals, threaded binary trees,

AVL Trees : Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching

B-Trees: B-Tree of order m, height of a B-Tree, insertion, deletion and searching, B+ Tree.

TEXTBOOKS:

1. Data Structures using C++, Special Edition-MRCET, Tata McGraw-Hill Publishers2017.

2. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.Education.

REFERENCE BOOKS:

1. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., SecondEdition

OUTCOMES:

At the end of the course the students are able to:

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations orcombinations.
- Implement and know the application of algorithms for sorting.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, AVL-trees, heaps andgraphs.

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(R18A0461) ANALOG AND DIGITAL ELECTRONICS

COURSE OBJECTIVES

The main objectives of the course are:

- To familiarize the student with the principal of operation, analysis and design of junction diode andBJT.
- To understand basic number systems codes and logicalgates.
- To introduce the methods for simplifying Booleanexpressions
- To outline the formal procedures for the analysis and design of combinational circuits and sequentialcircuits

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, diode equivalent circuits,, Zener diode characteristics.

UNIT-II

BIPOLAR JUNCTION TRANSISTOR: The Junctiontransistor, Transistor construction ,Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

UNIT-III

Number System and Boolean Algebra: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code,Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-IV

Minimization Techniques: The Karnaugh Map Method, Three, Four and Five Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

UNIT-V

Combinational Circuits: Design procedure – Half adder, Full Adder, Half subtractor, Full subtractor, Multiplexer/Demultiplexer, decoder, encoder, Code converters, Magnitude Comparator.

Sequential circuits: Latches, Flip-Flops-SR, JK, D, T and master slave, characteristic tables and equations, Conversion from one type of Flip-Flop to another.

TEXT BOOKS:

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications,2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGrawHill.
3. Electronic Devices and Circuits, S.Salivahanan,N.Sureshkumar, McGrawHill.
4. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 /Pearson Education (Singapore) Pvt. Ltd., New Delhi,2003.
5. Switching and Finite Automata Theory- ZviKohavi& Niraj K. Jha, 3rdEdition,Cambridge.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI,2006
4. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning,2002.
5. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning,2003.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- Understand and Analyze the PN and Zener diodes, operation and itscharacteristics
- Understand and analyze the BJTTransistor.
- Understand the basic postulates of Boolean algebra and shows the correlation between Booleanexpressions
- Learn the methods for simplifying Booleanexpressions
- Understand the formal procedures for the analysis and design of combinational circuits and sequentialcircuits

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(R18A0504) OPERATING SYSTEMS

OBJECTIVES:

- To learn the fundamentals of OperatingSystems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporaryOS
- To gain knowledge on distributed operating system concepts that includes architecture,
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrencymanagement

UNIT-I

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.

UNIT-II

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion,Hardware Solution, Strict Alternation, Peterson's Solution, The Producer/Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.

UNIT-III

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, protection and sharing, Disadvantages ofpaging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page

Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software.

UNIT-V

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

TEXT BOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin,Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall ofIndia.

REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, IrwinPublishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-HallofIndia
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

OUTCOMES:

At the end of the course the students are able to:

- Create processes andthreads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, ResponseTime.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the accesstime.
- Design and implement file managementsystem.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/Ocontrollers.

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(R18A0024) PROBABILITY AND STATISTICS

OBJECTIVES:

- To understand a random variable that describes randomness or an uncertainty in certain realistic situations which can be either discrete or continuoustype.
- To learn functions of multiple random variables through joint distributions since the random situations are described as functions of multiple randomvariables.
- To learn some of the important probability distributions like Binomial, Poisson Distributions (discrete case) and the Normal Distribution(continuouscase).
- To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independentvariable.
- To make inferences about a population from sample data(large and small samples) using probability theory.

UNIT – I: Random Variables
Single and multiple random variables -discrete and continuous. Probability distribution function, mass function and density function of probability distributions.Mathematical expectation and variance.

UNIT-II: Probability distributions
Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and normal distribution – properties, mean and variance.

UNIT -III: Correlation and Regression
Correlation -coefficient of correlation, rank correlation. Regression-regression coefficients, lines of regression.

UNIT –IV: Sampling
Sampling: Definitions of population, sampling, statistic, parameter - types of sampling - expected values of sample mean and variance, standard error - sampling distribution of means and variance. Estimation - point estimation and interval estimation.
Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, critical region - confidence interval - Level of significance, one tailed and two tailed test.

Unit-V: Statistical Inferences
Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, and difference of proportions.

Small samples: Test for single mean, difference of means, test for ratio of variances (F-test) - Chi-square test for goodness of fit and independence of attributes.

TEXT BOOKS:

1. Fundamental of Statistics by S.C. Gupta, Himalaya PublishingHouse.
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K. Kapoor, Sultan Chand Publishers.
3. Higher Engineering Mathematics by B.S. Grewal, KhannaPublishers.

REFERENCES:

1. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press.
2. Probability and Statistics by Dr.T.K.V Iyengar , B.KrishnaGandhi ,S. Ranganatham& M V S S A N Prasad. S ChandPublishers.

COURSE OUTCOMES:

At the end of the course the students are able to:

- Describe randomness in certain realistic situation which can be either discrete or continuoustype.
- Provide very good insight which is essential for industrial applications by learning probabilitydistributions.
- Make data-driven decisions by using correlation andregression.
- Understand the importance of sampling distribution of a given statistic of a random sample.
- Draw statistical inference using samples of a given size which is taken from a population and to apply statistical methods for analyzing experimentaldata.

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(R18A0505) COMPUTER ORGANIZATION

Objectives of the course:
To expose the students to the following:
1. How Computer Systems work & the basicprinciples
2. Instruction Level Architecture and InstructionExecution
3. The current state of art in memory systemdesign
4. How I/O devices are accessed and itsprinciples.
5. To provide the knowledge on Instruction LevelParallelism
6. To impart the knowledge on microprogramming
7. Concepts of advanced pipeliningtechniques.

UNIT I

Basic Functional units of Computers: functional units, basic Operational concepts, Bus structures. Software, Performance, Multiprocessors, Multicomputer. **Data Representation**: Signed number representation, fixed and floating point Representations. **Computer Arithmetic:** Addition and subtraction, multiplication Algorithms, Division Algorithms. Error detection and correction codes

UNIT II

Register Transfer Language and Micro Operations: RTL- Registers, Register transfers, Bus and memory transfers. **Micro operations:** Arithmetic, Logic, and Shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Computer Registers, Computer instructions, Instruction cycle. Instruction codes, Timing and Control, Types of Instructions: Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

UNIT III

Central Processing Unit organization: General Register Organization, Stack organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation, Program Control, **CISC** and **RISC** processors

Control unitdesign: **D**esign approaches, Control memory, Address sequencing, micro program example, design of CU. Micro ProgrammedControl.

UNIT IV

Memory Organization: Semiconductor memory technologies, hierarchy, Interleaving, **Main Memory-**RAM and ROM chips, Address map, Associative memory-Hardware organization. Match logic. Cache memory-size vs. block size, Mapping functions-Associate, Direct, Set Associative mapping. Replacement algorithms, write policies. **Auxiliary memory-**Magnetic tapes etc

UNIT V

Input –Output Organization: Peripheral devices, Input-output subsystems, I/O device interface, I/O Processor, I/O transfers–Program controlled, Interrupt driven, and DMA, interrupts and exceptions. I/O device interfaces – SCII, USB

Pipelining and Vector Processing: Basic concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards. **Case Sudy-** Introduction to x86 architecture.

Text Books:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy,Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher,McGraw Hill HigherEducation.

Reference Books:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes,WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, PearsonEducation.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. HeuringandHarry F. Jordan, Pearson Education.

Course Outcomes:

Upon completion of this course, students should be able to:

- Student will learn the concepts of computer organization for several engineeringapplications.
- Student will develop the ability and confidence to use the fundamentals of computer organization as a tool in the engineering of digitalsystems.
- An ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineeringprinciples

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(R18A506) DISCRETE MATHEMATICS

OBJECTIVES:

The course should enable the students to:

- Describe the logical and mathematical foundations, and study abstract models of computation.
- Illustrate the limitations of predicatelogic.
- Define modern algebra for constructing and writing mathematicalproofs.
- Solve the practical examples of sets, functions, relations and recurrencerelations.
- Recognize the patterns that arise in graph problems and use this knowledge for constructing the trees and spanningtrees

UNIT – I: MATHEMATICAL LOGIC AND PREDICATES

Mathematical logic: Statements and notations, connectives, well-formed formulas, truth tables, tautology,equivalence implication; Normal forms: Disjunctive normal forms, conjunctive normal forms, principle disjunctive normal forms, principle conjunctive normal forms;

Predicate calculus: Predicative logic,statement functions, variables and quantifiers, free and bound variables, rules of inference, consistency,proof of contradiction, automatic theorem proving.

UNIT – II: RELATIONS, FUNCTIONS AND LATTICES

Relations: Properties of binary relations, equivalence, compatibility and partial ordering relations, lattices,Hasse diagram; Functions: Inverse function, composition of functions, recursive functions; **Lattices:** Lattices as partially ordered sets; Definition and examples, properties of lattices, sub lattices, some special lattices.

UNIT - III ALGEBRAIC STRUCTURES AND COMBINATORICS

Algebraic structures: Algebraic systems, examples and general properties, semi groups and monoids, groups,sub groups, homomorphism, isomorphism, rings.

Combinatorics: The fundamental counting principles, permutations, disarrangements, combinations,permutations and combinations with repetitions, the binomial theorem, multinomial theorem, generalized inclusion exclusion principle.

UNIT - IV RECURRENCE RELATION

Recurrence relation: Generating functions, function of sequences calculating coefficient of generating function, recurrence relations, solving recurrence relation by substitution and generating functions, Characteristics roots solution of homogeneous recurrence relation.

UNIT - V GRAPHS AND TREES

Graphs: Basic concepts of graphs, isomorphic graphs, Euler graphs, Hamiltonian graphs, planar graphs, graph coloring, digraphs, directed acyclic graphs, weighted digraphs, region graph, chromatic numbers; **Trees:** Trees, spanning trees, minimal spanning trees.

TEXTBOOKS:

1. J. P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science , Tata McGraw Hill, India, 1st Edition,1997.
2.JoeL.Mott,AbrahamKandel,TheodoreP.Baker,—DiscreteMathematicsforComputerScientists and Mathematicians, Prentice Hall of India Learning Private Limited, New Delhi, India, 2nd Edition,2010.

REFERENCE BOOKS

1. Kenneth H. Rosen, —Discrete Mathematics and Its Applications, Tata Mcgraw-Hill, New Delhi, India, 6thEdition,2012.
2. C. L. Liu, D. P. Mohapatra, —Elements of Discrete Mathematics, Tata Mcgraw-Hill, India, 3rdEdition,2008.
3. Ralph P. Grimaldi, B. V. Ramana, —Discrete and Combinatorial Mathematics - An Applied Introduction , Pearson Education, India, 5th Edition,2011.
4. D. S. Malik, M. K. Sen, —Discrete Mathematical Structures: Theory and Applications, Thomson Course Technology, India, 1st Edition,2004.

OUTCOMES:

At the end of the course the students are able to:

- For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
- For a given a problem, derive the solution using deductive logic and prove the solution based on logicalinference
- For a given a mathematical problem, classify its algebraicstructure
- Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
- Develop the given problem as graph networks and solve with techniques of graph theory.

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(R18A0583) OPERATING SYSTEMS LAB

OBJECTIVES:

- To understand the functionalities of various layers of OSI model
- To explain the difference between hardware, software; operating systems, programs andfiles.
- Identify the purpose of different softwareapplications.

Week 1: Simulate the following CPU scheduling algorithms.

a) FCFS b) SJF c) Round Robin d) Priority.

Week 2: Write a C program to simulate producer-consumer problem using

Semaphores

Week 3: Write a C program to simulate the concept of Dining-philosophers problem.

Week 4: Simulate MVT and MFT.

Week 5: Simulate all page replacement algorithms

a)FIFO b) LRU c) OPTIMAL

Week 6: Simulate all File Organization Techniques

a) Single level directory b) Two level directory

Week 7: Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked.

Week 8: Simulate Bankers Algorithm for Dead Lock Avoidance.

Week 9: Simulate Bankers Algorithm for Dead Lock Prevention.

Week 10: Write a C program to simulate disk scheduling algorithms.

a) FCFS b) SCAN c) C-SCAN

REFERENCE BOOKS:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition,PHI.
2. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI

OUTCOMES:

At the end of the course the students are able to:

- Ability to implement interprocess communication between twoprocesses.
- Ability to design and solve synchronizationproblems.
- Ability to simulate and implement operating system concepts such as scheduling, Deadlock management, file management, and memorymanagement.

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(R18A0584) DATA STRUCTURES LAB

OBJECTIVES:

- To make the student learn a object oriented way of solvingproblems.
- To make the student write ADTS for all datastructures.

Week 1.

Write a program that uses functions to perform the following operations on singly linked list i) Creation ii) Insertion iii) Deletion iv) Traversal.

Week 2.

Write a program that uses functions to perform the following operations on doubly linked list i) Creation ii) Insertion iii) Deletion iv) Traversal.

Week 3.

Write a program that uses functions to perform the following operations on circular linked List i) Creation ii) Insertion iii) Deletion iv) Traversal.

Week 4.

Write a program that implement stack (its operations) using i) Arrays ii) Linked list(Pointers).

Week 5.

Write a program that implement Queue (its operations) using i) Arrays ii) Linked list(Pointers).

Week 6.

i) Write a program that implement Circular Queue (its operations) using Arrays.

ii) Write a program that uses both recursive and non recursive functions to perform the following searching operations for a Key value in a given list ofintegers:

a) Linear search b) Binarysearch.

Week 7.

Write a program that implements the following sorting

i) Bubble sort ii) Selection sort iii) Quick sort.

Week 8.

Write a program that implements the following

i) Insertion sort ii) Merge sort iii) Heapsort.

Week 9.

Write a program to implement all the functions of a dictionary (ADT)using Linked List.

Week 10.

Write a program to perform the following operations:

a) Insert an element into a binary searchtree.

b) Delete an element from a binary searchtree.

c) Search for a key element in a binary searchtree.

Week 11.

Write a program to implement the tree traversal methods.

Week 12.

Write a program to perform the following operations:

a) Insert an element into aAVLtree.
b) Delete an element from aAVLtree.
c) Search for a key element in a AVL tree.

TEXT BOOKS:

1. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek,Thomson.
2. Data Structures using C++, D.S. Malik,Thomson

OUTCOMES:

At the end of the course the students are able to:

- For a given Search problem (Linear Search and Binary Search) student will able to implement it.
- For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computationcomplexity.
- Student will able to write program for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Timecomplexity.

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(R18A0004) FRENCH LANGUAGE

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

OBJECTIVES

1. To inculcate the basic knowledge of the Frenchlanguage.
2. To hone the basic sentence constructions in day to day expressions for communication in theirvocation.
3. To culminate their major with evidence of a purposefuleducation.

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his admirations and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar: The expression of time – The –ir verbs in the present - The verbs do, go, take, come, -Adverbs - Reflexive verbs

Vocabulary: The days and months of the year - The sports – Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs “to want”, “to can” - Express capacity / possibility - Express will / desire – the future tense

Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement ordisagreement

Writing: Descriptions

Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House,2015
2. A propos, A1, Langers International,2010
3. Easy French Step-by-step by Myrna BellRochester
4. Ultimate French Beginner-Intermediate (Coursebook) By LividLanguage
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C.Cummings.

OUTCOMES

1. The students will be able to communicate in French at A1level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

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(R18A0507) DESIGN AND ANALYSIS OF ALGORITHMS

Course Objectives:

- To analyze performance ofalgorithms.
- To choose the appropriate data structure and algorithm design method for a specifiedapplication.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch andbound.
- To understand the differences between tractable and intractableproblems.
- To introduce P and NPclasses.

UNIT - I

Introduction-Algorithm definition, Algorithm Specification, Performance Analysis-Space complexity, Time complexity, Randomized Algorithms.

Divide and conquer- General method, applications - Binary search, Merge sort, Quick sort, Strassen's MatrixMultiplication.

UNIT - II

Disjoint set operations, union and find algorithms, AND/OR graphs, Connected Components and Spanning trees, Bi-connected components

Backtracking-General method, applications- The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT - III

Greedy method- General method, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

UNIT - IV

Dynamic Programming- General Method, applications- Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.

UNIT - V

Branch and Bound- General Method, applications-0/1 Knapsack problem, LC Branch and Bound solution, FIFO Branch and Bound solution, Traveling sales person problem.

NP-Hard and NP-Complete problems- Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, Cook's theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, UniversitiesPress.
2. Design and Analysis of Algorithms, P. H. Dave, H.B.Dave,2nd edition, Pearson Education.

REFERENCE BOOKS

1. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley andsons.
2. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ. Press
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, PearsonEducation.
4. Foundations of Algorithms,, R. Neapolitan and K. Naimipour, 4th edition, Jones and Bartlett Studentedition.
5. Introduction to Algorithms,3rd Edition, T. H. Cormen, C. E.Leiserson, R. L. Rivest, and C. Stein,PHI

Course Outcomes:

- Ability to analyze the performance ofalgorithms.
- Ability to choose appropriate algorithm design techniques for solvingproblems.
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance ofprograms.

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(R18A0508) FORMAL LANGUAGE & AUTOMATATHEORY

OBJECTIVES:

1. Understand mathematical models finite automata.
2. Explain Regular Expressions and Finite Automata Conversions.
3. Understand Grammars for Regular and Context Free Languages.
4. Learn Context Free Grammar Normal Forms and Push Down Automata.
5. Explain Computational theory and models.

UNIT I

Fundamentals: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings and languages, deterministic finite automaton and nondeterministic finite automaton, transition diagrams and languagerecognizers.

Finite Automata: NFA with ϵ transitions - significance, acceptance oflanguages. Conversions and Equivalence: Equivalence between NFA with and without ϵ transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Mealymachines.

UNIT II

Regular Languages: Regular sets, regular expressions, identity rules, Constructing finite automata for a given regular expressions, Conversion of finite automata to Regular expressions, Pumping lemma of regular sets, closure properties of regular sets.

UNIT III

Grammar Formalism: Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA,inter conversion, Contextfreegrammar,derivationtrees, sentential forms, Right most and leftmost derivation ofstrings.

UNIT IV

Context Free Grammars: Ambiguity in context free grammars, Minimization of context free grammars, Chomsky normal form, Greibach normal form, Pumping Lemma for Context Free Languages, Enumeration of properties of CFL.

Push Down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty stack and its equivalence, equivalence of CFL and PDA, inter conversion, Introduction to DCFL andDPDA.

UNIT V

Turing Machine: Turing Machine, definition, model, design of TM, computable functions, Turing recognizable (Recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, Church's hypothesis, counter machine, types of Turing machines.

Computability Theory: Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of problems, Universal Turing Machine, un decidability of posts correspondence problem, Turing reducibility, definition of P and NP problems, NP complete and NP hardproblems.

Text books

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to AutomataTheory, Languages, and Computation, Pearson Education Asia.

Reference books:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory ofComputation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in ComputerScience, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, TataMcGraw Hill.

Course Outcomes:

At the end of this course, student will be able to

1. Design Finite Automata models.
2. Construct Regular Expressions and equivalent automata models.
3. Formulate Grammars for Formal languages.
4. Represent Normal Forms and Push DownAutomata.
5. Experiment with Computational models.

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(R18A0509) JAVA PROGRAMMING

Objectives:

- The objective of this course is to provide object oriented concepts through which robust, secured and reusable software can be developed.
- To understand object oriented principles like abstraction, encapsulation, inheritance, polymorphism and apply them in solving problems.
- To understand the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes.
- To understand the implementation of packages and interfaces.
- To understand the concepts of exception handling, multithreading and collection classes.
- To understand how to connect to the database using JDBC.
- To understand the design of Graphical User Interface using applets and swing controls.

UNIT-I

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Java Programming- History of Java, comments, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, arrays, simple java stand alone programs, class, object, and its methods constructors, methods, static fields and methods, access control, this reference, overloading constructors, recursion, exploring string class, garbage collection

UNIT – II

Inheritance – Inheritance types, super keyword, preventing inheritance: final classes and methods..

Polymorphism – method overloading and method overriding, abstract classes and methods**.**

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface, inner class.

Packages- Defining, creating and accessing a package, importing packages.

UNIT-III

Exception handling-Benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.

Multithreading – Differences between multiple processes and multiple threads, thread life cycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer problem.

UNIT-IV

Collection Framework in Java – Introduction to java collections, Overview of java collection framework, Commonly used collection classes- Array List, Vector, Hash table, Stack, Lambda Expressions.

Files- Streams- Byte streams, Character streams, Text input/output, Binary input/output, File management using File class.

Connecting to Database – JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC,Data Access Object (DAO).

UNIT-V

GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – Jbutton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types – border, grid and flow

Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

TEXT BOOK:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Core Java: An Integrated Approach – Dr R Nageswara Rao

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
5. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides.

Outcomes:

- An understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs usinga high level language;
- An appreciation of the principles of object oriented programming;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.

- Demonstrate the ability to use simple data structures like arrays in a Java program.
- Be able to make use of members of classes found in the Java API (such as the Math class).
- Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
- Able to develop applications using Applet, AWT, JDBC and Swings

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(R18A0510) DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- To study the physical and logical database designs, database modeling, relational, hierarchical, and networkmodels
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), DataWarehousing.
- To design and build a simple database system and demonstrate competence withthe fundamental tasks involved with modeling, designing, and implementingaDBMS.

UNIT I:

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction – Instances and Schemas – Database Languages – database Access for applications Programs – Database Users and Administrator – Transaction Management – Database Architecture – Storage Manager – the Query Processor.

Data Models: Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams. Database design– Other Models, ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations.

UNIT II:

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple Relational Calculus (TRC) – Domain relational calculus (DRC).

Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers, Procedures.

UNIT III:

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form.

Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form

UNIT IV:

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

UNIT V:

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Check Points - Buffer Management – Failure with loss of nonvolatile storage.

TEXTBOOKS:

1. Database System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.(All UNITS except IIIth)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.

REFERENCE BOOKS:

1. Fundamentals of Database Systems, ElmasriNavathePearsonEducation.
2. An Introduction to Database systems, C.J. Date, A.Kannan, S.SwamiNadhan, Pearson, Eight Edition for UNITIII.

Outcomes:

- Demonstrate the basic elements of a relational database managementsystem
- Ability to identify the data models for relevant problems
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data
- Apply normalization for the development of applicationsoftware’s

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(R18A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

Course Outcomes:

Students should be able,

- To understand the basic economic principles, forecast demand and supply.
- To estimate cost and understand market structure, pricing practices.
- To interpret the financial results of the organisation.

Unit-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.

Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

Unit-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing;

Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

Unit-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

References:

- Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
- D.N. Dwivedi, Managerial Economics, Vikas Publications.
- Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
- P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
- S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
- M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

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OPEN ELECTIVE - I

(R18A0451) DIGITAL ELECTRONICS

COURSE OBJECTIVES:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Booleanexpressions.
2. To introduce the methods for simplifying Booleanexpressions.
3. To outline the formal procedures for the analysis and design of combinational and sequentialcircuits.
4. To introduce the concept of memories and programmable logicdevices.
5. To illustrate the concept of synchronous and asynchronous sequentialcircuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,

AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NORimplementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

TEXT BOOK:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi,2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH,2006.

REFERENCES:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI,2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning,2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning,2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc,2011.
5. Donald D Givone, "Digital Principles and Design", TMH,2003.

COURSE OUTCOMES

After the completion of the course, the student will be able to:

1) Analyze different methods used for simplification of Booleanexpressions
2) Design and implement Combinational and Sequentialcircuits.
3) Design and implement Synchronous and Asynchronous SequentialCircuits

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OPEN ELECTIVE - I

(R18A0551) DATABASE SYSTEMS

OBJECTIVES

1. To understand the basic concepts and the applications of databasesystems
2. To Master the basics of SQL and construct queries usingSQL
3. To understand the relational database designprinciples
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and accesstechniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations-Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated-Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's-Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF andBCNF-Decompositions and desirable properties-

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition ,2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, PearsonEducation.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,"Fundamentals of Database System," Addison-Wesley Publishing, 5th Edition,2008.
3. Date.C.J, "An Introduction to Database", Addison-Wesley Pub Co, 8th Edition,2006.
4. Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning,2009.

OUTCOMES

1. Demonstrate the basic elements of a relational database managementsystem
2. Ability to identify the data models for relevantproblems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respectdata

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OPEN ELECTIVE I

(R18A0553) DATA STRUCTURES USING PYTHON

OBJECTIVES:

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.

Unit I

Introduction to Python, Installation and Working with Python, Understanding Python variables Python basic Operators, Understanding python blocks, Python Data Types: Declaring and using Numeric data types: int, float,complex,Using string data type and string operations.

UNIT II

Control Flow- if, if-elif-else,loops ,For loop using ranges, string ,Use of while loops in python,Loop manipulation using pass, continue, break and else,Programming using Python conditional and loops block,Python arrays.

UNIT III

Functions -Calling Functions, Passing Arguments, Keyword Arguments,Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.PowerfulLamda function in python.

UNIT IV

Data Structures-List Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions,Dictionary manipulation, list and dictionary in build functions

UNIT V

Sorting:BubbleSort,SelectionSort,InsertionSort,Mergesort,Quicksort.LinkedLists,Stacks,Queues

OUTCOMES: Upon completion of the course, students will be able to

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
2. R. Nageswara Rao, “Core Python Programming”, dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

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OPEN ELECTIVE - I

(R18A0351) INTELLECTUAL PROPERTY RIGHTS

Course Objectives:

1. To create an understanding on Intellectual Properties and the importance of it.
2. To acquire knowledge on Trademarks, Trade secrets & unfair completion methods.
3. To create awareness on the protection of copyrights and patents.
4. To attain basic understanding of Cyber laws, Cyber Crime and get an understanding of Privacy of Data.
5. To gain knowledge on international aspects and the Emerging Trends in IPR.

UNIT - I:

Introduction: Introduction to Intellectual property, types of intellectual property, importance of intellectual property rights, agencies Responsible for Intellectual property Registration, Regulatory – Compliance and Liability Issues.

UNIT - II:

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, Transfer of Rights, protectable matter, selecting and evaluating trade mark, Registrations of Trade Marks, Claims.

Trade Secrets: Determination of trade secret status, liability for misappropriations of trade secrets, protection for submission.

Unfair competition- Misappropriation right of publicity, false advertising

UNIT - III:

Copy rights: Fundamental of copy right, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, notice of copyright.

Patents: introduction, patent searching process, ownership rights and transfer.

UNIT - IV:

Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

UNIT - V:

New development of Intellectual Property: Emerging trends in trade mark; copy rights, patent, International overview on intellectual property.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah, E. Bouchoux, cengagelearning.
2. Cyber Law. Text & Cases, South-Western's Special Topicscollections.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi
4. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.

5. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
6. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
7. Intellectual Property Rights: C B Raju: ISBN-8183870341

Course Outcomes:

Student will be able to:

1. Prepare and protect the Inventions, startup ideas and rights of patents and copy rightsetc.,
2. Gain knowledge on Trademarks and Trade Secrets.
3. Brings awareness on the various types of Unfair Competition and gets well versed with exposure to licensing and transfer of Copyrights and Patents
4. Attain awareness of Cyber laws and Cyber Crime, to protect the data from Cybercrime.
5. Comprehend emerging trends in IPR globally.

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OPEN ELECTIVE - I

(R18A0352) GREEN ENERGY SYSTEMS

COURSE OBJECTIVES:

1. The course aims to highlight the significance of alternative sources ofenergy.
2. Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

UNIT-I

Introduction:

Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics.

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

Solar Energy Storage And Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney. **Wind Energy:** Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind datameasurement.

UNIT – III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants,thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

Energy Efficient Systems: (A) Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

(B) Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Green Buildings: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage,TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi,2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S NanjundaRa.
2. Principles of Solar Energy / Frank Krieth& John FKreider.
3. Non-Conventional Energy / Ashok V Desai /WileyEastern.
4. Renewable Energy Technologies /Ramesh & Kumar/Narosa
5. Renewable Energy Technologies/ G.DRoy

COURSE OUTCOMES:

1. The student shall understand the principles and working of solar, wind, biomass, geo-thermal, oceanenergies.
2. Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential futureapplications.

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OPEN ELECTIVE I

(R18A0555) DATA VISUALIZATION

Course Objectives:

- To learn different statistical methods for Data visualization.
- To understand the basics of R and Python.
- To learn usage of Watson studio.
- To understand the usage of the packages likeNumpy, pandas and matplotlib.
- To know the functionalities and usages of Seaborn.

UNIT I

Introduction to Statistics : Introduction to Statistics, Difference between inferential statistics and descriptivestatistics, Inferential Statistics- Drawing Inferences fromData, RandomVariables, Normal ProbabilityDistribution, Sampling, Sample Statistics and SamplingDistributions.

R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

UNIT II

Data manipulation withR: Data manipulation packages-dplyr,data.table, reshape2, tidyr, Lubridate, Data visualization withR.

Data visualization in Watson Studio: Adding data to datarefinery, Visualization of Data on WatsonStudio.

UNIT III

Python: Introduction toPython, How toInstall, Introduction to JupyterNotebook, Python scriptingbasics, NumpyandPandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and datetime columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools inPython- Introduction to Matplotlib, Basic plots usingmatplotlib, Specialized Visualization Tools usingMatplotlib, Advanced Visualization Tools usingMatplotlib- WaffleCharts, WordClouds.

UNIT V

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.
2. Hands on programming with R by Garrett Grolemund,Shroff/O'Reilly; First edition
3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress
2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc. \
3. The Comprehensive R Archive Network- https://cran.r-project.org
4. https://seaborn.pydata.org/
5. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization.
- Gain knowledge on R and Python
- Understand usage of various packages in R and Python.
- Demonstrate knowledge of Watson studio.
- Apply data visualization tools on various data sets.

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(R18A0585) JAVA PROGRAMMING LAB

OBJECTIVES:

- To prepare students to become familiar with the Standard Java technologies of J2SE
- To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorouseducation.
- To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP,JavaScript
- To train Students with good OOP programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
- To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
- To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professionalcareer.

Week1	Write a java program to find the Fibonacci series using recursive and non recursive functions
Week2	Write a java program to multiply two given matrices.
Week3	Write a java program for Method overloading and Constructor overloading
Week4	write a java program that prompts the user for an integer and then printouts all prime numbers up to that integer
Week5	Write a java program to display the employee details using Scanner class
Week6	Write a java program that checks whether a given string is palindrome or not
Week7	A)Write a java program to represent Abstract class with example. B)Write a java program to implement Interface using extends keyword
Week8	A)Write a java program to create user defined package

B) Write a java program to create inner classes

Week9 A) Write a java program for creating multiple catch blocks
B) Write a java program for producer and consumer problem using Threads

Week10 Write a Java program that implements a multi-thread application that has three threads

Week11 A) Write a java program to display File class properties
B) Write a java program to represent ArrayList class

C) Write a Java program loads phone no, name from a text file using hash table

Week12 Write an applet program that displays a simple message

Week13 A) Write a Java program compute factorial value using Applet
B) Write a program for passing parameters using Applet

Week14 Write a java program for handling Mouse events and Key events

Week15 Write a java program that connects to a database using JDBC

Week16 A) Write a java program to connect to a database using JDBC and insert values into it
B) Write a java program to connect to a database using JDBC and delete values from it

Week17 Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result

TEXT BOOK:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI

OUTCOMES:

- Able to analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts inOOP.
- Demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and reportresults.
- Demonstrate an ability to design an object oriented system, AWT components or multithreaded process as per needs andspecifications.
- Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets program

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(R18A0586) DATABASE MANAGEMENT SYSTEMS LAB

Objectives

Students will have the ability to:

- Keepabreastofcurrentdevelopmentstocontinuetheirownprofessional development.
- To engage themselves in lifelong learning of Database managementsystems theories and technologies this enables them to purse higherstudies.
- To interact professionally with colleagues or clients located abroad and the ability to overcome challenges that arises from geographic distance, cultural differences,andmultiplelanguagesinthecontextofcomputing.
- Develop team spirit, effective work habits, and professional attitude in written and oral forms, towards the development of databaseapplications

A. **Practice on SQL Queries to acquire knowledge onRDBMS.**

B. **CaseStudy:**

Objective: This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database -Roadway travels". Students are expected to use "Mysql" database.

Roadway Travels: "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations andTicketing
- Cancellations
- **Reservations &Cancellation:**

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above Process involves many steps like 1. Analyzing the problem and identifying the Entitites and Relationships, 2. E-R Model, 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed toworkonthesestepsweekwiseandfinallycreateacomplete"DatabaseSystem" to Roadway Travels. Examples are given at every experiment for guidance to students.

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Experiment 1: E-R Model

Analyze the problem carefully and come up with the entities in it using software design tool. Identify what data has to be persisted in the database. This contains the entities, attributesetc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example:

Entities:

1. BUS
2. Ticket
3. Passenger

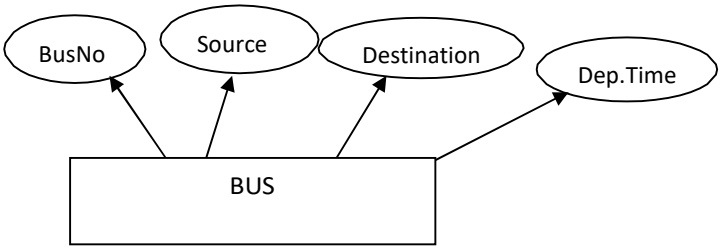
Relationships:

1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

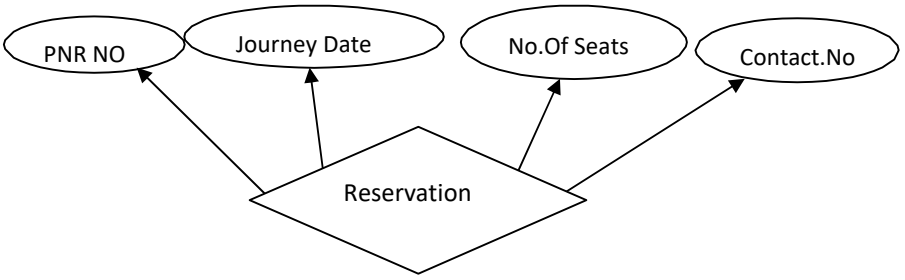
1. Ticket ID (Ticket Entity)
2. Passport ID (PassengerEntity)
3. Bus_NO(BusEntity)

Apart from the above mentioned entities you can identify more. The above mentioned



are few.

Ex: Bus Entity



Ex: Reservation relationship

Note: ***The student is required to submit a document by writing the Entities and Keys to the lab teacher***

Experiment 2: Installation of Mysql and practicing DDL, commands

Installation of MySql. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized

"Passenger" table. CREATE TABLE Passenger (

Passport_id INTEGER

PRIMARY KEY, Name
VARCHAR (50) Not NULL,
Age Integer Not
NULL, Sex Char,
Address VARCHAR (50) Not NULL);
Similarly create all other tables.
Note: Detailed creation of tables is given at the end.

Experiment 3: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the adatabase
- INSERT - insert data into atable
- UPDATE - updates existing data within atable
- DELETE-deletesallrecordsfromatable,the space for The recordsremain

Inserting values into "Bus" table:

Insert into Bus values(1234,'hyderabad', ‘tirupathi'

Insert into Bus values (2345,’hyderabd’ ‘Banglore’); Insert into Bus values (23,'hyderabd','Kolkata');
Insert into Bus values (45,'Tirupathi,'Banglore'); Insert into Bus values (34,'hyderabd','Chennai');

Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,’M', ‘abc123'); Insert into Passenger values (2, 78,'geetha', 36,'F','abc124'); Insert into Passenger values (45, 90,' ram', 30,'M','abc12'); Insert into Passenger values (67, 89,' ravi', 50,'M','abc14'); Insert into Passenger values (56, 22,'seetha', 32,'F','abc55'); **Few more Examples of DML commands:**

Select * from Bus; (selects all the attributes and display) UPDATE BUS SET Bus No = 1

WHERE BUS NO=2;

Experiment 4: Querying

Inthisweekyouaregoingtopracticequeries(alongwithsubqueries)usingANY,ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraintsetc.

Practice the following Queries:

Display unique PNR_no of all
Passengers. Display all the names
of male passengers.
Display the ticket numbers and names of all the passengers.
Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'. Find the names of passengers whose age is between 30 and 45.
Display all the passengers names
beginning with 'A' Display the sorted
listofpassengersnames

Experiment 5: Aggregate Functions and Number Functions, Nested Query and Co-related Queries You are going to practice queries using Aggregate functions and number functions(COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use UNION Operator.

Display the number of days in a week on which the 9W01 bus is available.

Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR_No.

Find the distinct PNR numbers that are present.

Find the number of tickets booked by a passenger where the number of seats is greater than 1.Hint: Use GROUP BY, WHERE and HAVING CLAUSES.

Find the total number of cancelled seats.

Nested Query and Co-related Queries

Usethetablessailors,reserves,boatsforimplementing the
following Sailors(sid: integer, sname: string,rating:
integer, age: real); Boats(bid: integer, bname: string,
color: string);
Reserves(sid: integer, bid: integer, day: date).

a. Find the names of sailors who have reserved boat103
b. nd the name and the age of the youngestsailor
c. Find the names and ratings of sailor whose rating is better than some sailorcalled

Horatio

d. Find the names of sailors who have reserved allboats

Experiment 6: **VIEWS and JOIN**

Inthisweek,wearegoingtoimplementviewsandalsoperformvariousoperations like alter, update and deletecommands.

View:

Write a query to execute and verify the SQL commands using Views (UseEmployee Table)

(a) Alter (b) Update (c)Delete

Join:

Write a query to execute and verify the SQL commands using Join (Use Customer Table)

(a) Inner join, (b).Left join, (c).Right join (d).Fulljoin

Experiment 7: **Triggers**

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON

passenger FOR EACH ROW BEGIN

IF NEW.Tickent N0 > 60 THEN SET New.Tickent no =

Ticket no; ELSE

SET New.Ticket no =

0; END IF;

END;

Experiment 8: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: CREATE PROCEDURE myProc()

BEGIN

SELECT COUNT(Tickets) FROM Ticket WHERE
age>=40; End;

Experiment 9: Cursors

In this week you need to do the following: Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

```
CREATE PROCEDURE myProc (in_customer_id INT)
BEGIN DECLARE v_id INT;
DECLARE v_nameVARCHAR(30);
DECLARE cl CURSOR FOR SELECT ppno,name FROM Passenger WHERE
ppno=in_customer_id; OPEN cl;
FETCH cl into v_id,
v_name; Close cl;
END
```

Tables BUS

Bus No: Varchar: PK (Primary key) Source: Varchar

Destination: Varchar

DeptTime:Varchar**P assenger**

PPNO: Varchar(15)) :

PK Name:

Varchar(15)

Age : int (4)

Sex:Char(I 0) : Male/Female

Address: VarChar(20)

Passenger_Tickets

PPNO: Varchar(15)) : FK Ticket No: Numeric (9)

Reservation

PNR_No: Numeric(9) :

PK Journey_date :

datetime(8)

No_of_seats : int (8)

Address: Varchar (50)

Contact_No: Numeric (9) —> Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes /

No **Cancellation**

PNR_No:Numeric(9):

FK Journey_date:

datetime (8)

No_of_seats : int (8)

Address : Varchar (50)

Contact_No: Numeric (9) —> Should not be less than 9 and should not accept any other character other than Integer

Status: Char (2) : Yes / No

Ticket

Ticket_No:

Numeric(9): PK

Journey_date :

datetime(8) Age : int

(4)

Sex:Char(10) :

Male/Female Source :

Varchar Destination :

Varchar Dep_time :

Varchar

Experiment 10: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data

integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instanceonly.

For the above table in the First normalization we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger

Name	Age	Sex	Address	PassportID

Passport_id	Ticket_id

Youcandothesecondandthirdnormalformsifrequired.AnyhowNormalized tables are given at theend.

Experiment 11: PL/SQL Programs

In this week, you are going to learn and work on PL/SQL procedures.

a. Write a PL/SQL procedure to find the average ofmarks?
b. Write a PL/SQL procedure to find the factorial of anumber?
c. Write a PL/SQL code to calculate tax for an employee of an organization – XYZ and to display his/her name & tax, by creating a table under employeedatabaseasbelow.

Employee_salaryEmp_no Basic HRA DA Total_deductionNet_salaryGross_salary

Experiment 12: Revoke/Grant/Commit/Rollback

In this week, you need to do the following: Declare a table that defines a result set using revoke, grant, savepoint, commit, rollback operations

Consider the following tables namely "DEPARTMENTS" and "EMPLOYEES"
Their schemas are as follows, Departments (dept _no , dept_ name , dept_location); Employees (emp_id , emp_name , emp_salary);

a. Developaquerytograntallprivilegesofemployeestableintodepartments table
b. Developaquerytograntsomeprivilegesofemployeestableintodepartmentstable
c. Developaquerytorevokeallprivilegesofemployeestablefromdepartments table
d. Developaquerytorevokesomeprivilegesofemployeestablefromdepartmentstable
e. Write a query to implement the savepoint
f. Writeaquerytoimplementthe commit g.Write a query to implementrollback

Reference Books:

1. IntroductiontoSQL,RickF.VanderLans,Pearsoneducation..
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education. 3.OraclePL/SQL Programming,StevenFeuerstein,SPD.
4.SQL & PL/SQL for Oracle 10g,B lack Book, Dr.P.S.Deshpande, Dream Tech. 5.Oracle Database 11g PL/ SQL Programming,M. Mc Laughlin,TMH. 6.SQL Fundamentals, J.J.Patrick,Pearson Education

Outcomes:

Students will be able to demonstrate their skills

- In drawing the ER, EER, and UMLDiagrams.
- In analyzing the business requirements and producing a viable model forthe implementation of thedatabase.
- In converting the entity-relationship diagrams into relationaltables.
- TodevelopappropriateDatabasestoagivenproblemthatintegratesethical, social, legal, and economicconcerns.

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II Year B. Tech CSE -IISem **L T/P/D C**
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(R18A0014) ENVIRONMENTAL SCIENCE (MandatoryCourses)

OBJECTIVE:

We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around us. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects this ethos. There is a direct application of this wisdom even in modern times. Idea of an activity-based course on environment protection is to sensitize the students on the above issues through following two type ofactivities.

UNIT I

Environmental Education and Ecosystems

Environmental education: Definition and objective. Origin of Environmental sciences from Vedas, Structure and function of an ecosystem, Food chain and Food Web, Ecological Pyramids, Bioaccumulation and Biomagnification.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on importance of Environmental Education

UNIT II

Natural Resources

Introduction: definition, Forest resources- Uses, Causes and consequences of deforestation, Water resources-Sources and Uses of Water, Benefits and problems of DAMs, Energy resources-Renewable and Non-renewable energy resources.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Natural Resources

UNIT III

Environmental Pollution

Environmental segments – structure and composition of atmosphere. Pollution – Sources, effects and control of Air, water. Climate change-ozone layer depletion, Global warming/greenhouse effect.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Environmental pollution.

UNIT IV

Waste Management

Solid waste management: sources, effects and control of municipal waste, bio medical waste - waste management andE-waste.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Cleanliness, segregation of waste and Swacha-Bharath

UNIT V

Social Issues and the Environment

Concept, threats and strategies of sustainable development, Water conservation-rain water harvesting, Energy conservation, Green activities.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Social Issues and theEnvironment.

TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.
2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford UniversityPress.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. NewDelhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela.2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B.Botkin& Edward A.Keller, Wiley INDIAedition.
4. Principles of Environmental Science by William . P. Cunnningham& Mary Inn Cunnningham Tata McGRAW –Hill Publishing CompanyLtd.
5. Environmental Studies by S. Rama Lakshmi & Purnima SmarathKalyaniPublishers.

OUTCOMES:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of Ecological principles and environmental regulations which in turn helps in sustainable development. Understand the complex relationships between natural and human systems.

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III Year B. Tech CSE -ISem

L	T/P/D	C
3	-/-/-	3

(R18A0511) SOFTWARE ENGINEERING

OBJECTIVES:

- To comprehend the various software process models.
- To understand the types of software requirements and SRS document.
- To know the different software design and architecturalstyles.
- To learn the software testing approaches and metrics used in softwaredevelopment.
- To know about quality control and riskmanagement.

UNIT - I:

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II:

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirementsmanagement.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT - III:

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, ArchitecturalDesign.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Designevaluation.

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMMPlan.

UNIT - V:

Quality Management: Software Quality**,** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS :

1. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGrawHillInternationalEdition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearsoneducation.

REFERENCE BOOKS :

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill,2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford UniversityPress.
4. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition,2006.
5. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley &SonsLtd.
7. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer InternationalEdition.
8. Introduction to Software Engineering, R. J. Leach, CRCPress.

OUTCOMES:

At the end of the course the students are able to:

- To compare and select a process model for a businesssystem.
- To identify and specify the requirements for the development of anapplication.
- To develop and maintain efficient, reliable and cost effective softwaresolutions.
- To critically think and evaluate assumptions and arguments of the client.

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(R18A0512) Compiler Design

Objectives:

• To provide an initial Understanding of language translators, Knowledge of various techniques used in compiler construction and also use of the automated tools available in compilers construction.

UNIT – I:

Language Translation: Basics, Necessity, Steps involved in atypical language processing system, Types of translators, **Compilers:** Overview and Phases of a Compiler, Pass and Phases of translation, bootstrapping, data structures in compilation

Lexical Analysis (Scanning): Functions of Lexical Analyzer, **Specification of tokens:** Regular expressions and Regular grammars for common PL constructs. **Recognition of Tokens:** Finite Automata in recognition and generation of tokens. **Scanner generators:** LEX-Lexical Analyzer Generators. **Syntax Analysis (Parsing) :**Functions of a parser, Classification of parsers. Context free grammars in syntax specification, benefits and usage in compilers.

UNIT – II:

Top down parsing –Definition, types of top down parsers: Backtracking, Recursive descent, Predictive, LL (1), Preprocessing the grammars to be used in top down parsing, Error recovery, and Limitations. **Bottom up parsing:** Definition, types of bottom up parsing, Handle pruning. Shift Reduce parsing, **LR parsers:** LR(0), SLR, CALR and LALR parsing, Error recovery, Handling ambiguous grammar, **Parser generators:** YACC-yet another compiler compiler. .

UNIT – III:

Semantic analysis: Attributed grammars, Syntax directed definition and Translation schemes, Type checker: functions, type expressions, type systems, types checking of various constructs.

Intermediate Code Generation: Functions, different intermediate code forms- syntax tree, DAG, Polish notation, and Three address codes. Translation of different source language constructs into intermediate code.

Symbol Tables: Definition, contents, and formats to represent names in a Symbol table. Different approaches used in the symbol table implementation for block structured and non block structured languages, such as Linear Lists, Self Organized Lists, and Binary trees, Hashing basedSTs.

UNIT –IV:

Runtime Environment: Introduction, Activation Trees, Activation Records, Control stacks. Runtime storage organization: Static, Stack and Heap storage allocation. Storage allocation for arrays, strings, and records etc.

Code optimization: goals and Considerations for Optimization, Scope of Optimization: Local optimizations, DAGs, Loop optimization, Global Optimizations. Common optimization techniques: Folding, Copy propagation, Common Sub expression eliminations, Code motion, Frequency reduction, Strength reduction etc

UNIT – V:

Control flow and **Data flow analysis:** Flow graphs, Data flow equations, global optimization: Redundant sub expression elimination, Induction variable eliminations, Live Variable analysis. **Object code generation:** Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

TEXT BOOKS:

1. Compilers, Principle, Techniques, and Tools. – Alfred.VAho, Monica S.Lam, Ravi Sethi,Jeffrey D. Ullman ; 2nd Edition, Pearson Education.
2. Modern Compiler implementation in C , - Andrew N.Appel Cambridge UniversityPress.

REFERENCES:

1. **lex&yacc**, -John R Levine, Tony Mason, Doug Brown;O'reilly.
2. **Compiler Construction**,-LOUDEN,Thomson.
3. Engineering a compiler – Cooper &Linda,Elsevier
4. Modern Compiler Design – Dick Grune, Henry E.Bal, Cariel TH Jacobs, WileyDreatech

Outcomes:

By the end of the semester, the student will be able to:

- Understand the necessity and types of different language translators inuse.
- Apply the techniques and design different components (phases) of a compiler byhand.
- Solve problems, Write Algorithms, Programs and test them for theresults.
- Use the tools Lex, Yacc in compilerconstruction.

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III Year B. Tech CSE -ISem

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3	-/0/-	3

(R18A0464)EMBEDDED SYSTEMS

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1) To understand the basics of microprocessors and microcontrollers architecture and itsfunctionalities
2) Understand the core of an embeddedsystem
3) To learn the design process of embedded systemapplications.
4) To understands the RTOS and inter-processcommunication.

UNIT-I:

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS: 8086 Microprocessor: Architecture of 8086, Register Organization, Programming Model, Memory Segmentation, Signal descriptions of 8086, Addressing modes, Instruction Set.

8051 Microcontroller: 8051 Architecture, I/O Ports, Memory Organization, Instruction set of 8051.

UNIT-II: INTRODUCTION TO EMBEDDED SYSTEMS:

History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, Applications of embedded systems, and characteristics of embedded systems, Operational and Non-operational attributes of embedded systems.

UNIT-III: TYPICAL EMBEDDED SYSTEM

Core of the embedded system, Sensors and actuators, Onboard communication interfaces-I2C, SPI, parallel interface**;** External communication interfaces-RS232, USB, infrared, Bluetooth, Wi-Fi, ZigBee, GPRS.

UNIT-IV: EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT-V EMBEDDED PROGRAMMING CONCEPTS

Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ &JAVA

TEXT BOOKS:

1. Embedded Systems, Raj Kamal, Second EditionTMH.
2. Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., CengageLearning
3. Introduction to Embedded Systems - shibu k v, Mc Graw HillEducation.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, TMH, 2nd Edition2006
2. Embedded Systems- An integrated approach - Lyla B Das, Pearson education2012.

COURSE OUTCOMES:

After going through this course the student will be able to

1) The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2) Understand and design the Embeddedsystems
3) Understand Embedded Firmware designapproaches
4) Learn the basics ofRTOS

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III Year B. Tech CSE -I Sem

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(R18A0513)PYTHON PROGRAMMING

OBJECTIVES:

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I

INTRODUCTION DATA, EXPRESSIONS, STATEMENTS

Introduction to Python and installation, variables, expressions, statements, Numeric data types: Int, float, Boolean, string. Basic data types: list--- list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters. Tuple --- tuple assignment, tuple as return value, tuple methods. Dictionaries: operations and methods.

UNIT II

CONTROL FLOW, LOOPS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: statements break, continue.

Functions--- function and its use, pass keyword, flow of execution, parameters and arguments.

UNIT III

ADVANCED FUNCTIONS, ARRAYS

Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Advanced Functions: lambda, map, filter, reduce, basic data type comprehensions.

Python arrays: create an array, Access the Elements of an Array, array methods.

UNIT IV

FILES, EXEPTIONS

File I/O, Exception Handling, introduction to basic standard libraries, Installation of pip, Demonstrate Modules: Turtle, pandas, numpy, pdb, Explore packages.

UNIT V

OOPS , FRAMEWORK

Oops concepts: Object, Class, Method, Inheritance, Polymorphism, Data abstraction, Encapsulation,

Python Frameworks: Explore django framework with an example

OUTCOMES: Upon completion of the course, students will be able to

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.

- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs

TEXT BOOKS:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
2.R. Nageswara Rao, “Core Python Programming”, dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

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III Year B.Tech. CSE - I Sem **LT/P/D C**

3 -/-/- 3

Professional Elective-1

(R18A1205)ARTIFICIAL INTELLIGENCE

Course Objectives: To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents **Basic Search Strategies**: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning

Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non- monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice- Hall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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III Year B. Tech CSE -ISem **L T/P/D C**

3 -/-/- 3

Professional Elective-1
(R18A0515) Pervasive Computing

COURSE OBJECTIVES: The objective of this course is To study the pervasive computing and its applications To study the pervasive computing web based applications To study voice enabling pervasive computing To study PDA in pervasive computing To study user interface issues in pervasive computing

UNIT I:

Pervasive Computing Applications: - Pervasive Computing devices and Interfaces - Device technology trends, - Connecting issues and protocols

UNIT II:

Pervasive Computing and web based Applications: - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security - Wireless Mark-Up language (WML)

UNIT III:

Voice Enabling Pervasive Computing: - Voice Standards - Speech Applications in Pervasive Computing and security

UNIT IV:

PDA in Pervasive Computing: – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture

UNIT V:

User Interface Issues in Pervasive Computing, Architecture: - Smart Card- based Authentication Mechanisms - Wearable computing Architecture

TEXT BOOKS:

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec& Klaus Rindtorff. --- Pervasive Computing Technology and Architecture of Mobile Internet Applications, Addision Wesley, Reading, 2002.

2. Uwe Ha nsman, LothatMerk, Martin S Nicklous& Thomas Stober: Principles of Mobile Computing, Second Edition, Springer- Verlag, New Delhi,2003.

REFERENCE BOOKS:

1. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice – Hall of India, New Delhi, 2003. (ISBN81-203-2185-5)

2. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani,2003.

COURSE OUTCOMES:

On successful completion of the course, the student will:
Be able to learn pervasive computing devices and interfaces.
Be able to learn XML role in pervasive computing.
To get clear idea about WAP architecture and security.
Be able to learn speech application in pervasive computing.
Become familiar with different voice standards. Identify user interface issues in pervasive computing.

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Professional Elective-1
(R18A0516) Information Security

Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understandthebasiccategoriesofthreatstocomputersandnetworks
- Describe public-keycryptosystem.
- Describe the enhancements made to IPv4 byIPSec
- Understand Intrusions and intrusiondetection
- Discuss the fundamental ideas of public-keycryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web securityandFirewalls

UNIT — I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT — II

Symmetric key Ciphers: Block Cipher principles &Algorithms(DES, AES), Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman), Key Distribution.

UNIT — III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, Digital signatures, **Authentication Applications:** Kerberos, X.509 Authentication Service, Public — Key Infrastructure, BiometricAuthentication

UNIT — IV

E-Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

UNIT — V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure **Inter-branch** Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

TEXT BOOKS:

1. Cryptography and Network Security :WilliamStallings, Pearson Education,4[11]iEdition
2. CryptographyandNetworkSecurity:AtulKahate,McGrawHill,2"Edition

REFERENCE BOOKS:

1. Cryptographyand Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, lstEdition.
2. CryptographyandNetworkSecurity:ForouzanMukhopadhyay,McGrawHill,2"dEdition
3. InformationSecurity,PrinciplesandPractice:MarkStamp,WileyIndia.
4. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White,TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGELearning
6. Network Security and Cryptography: Bernard Menezes,CENGAGELearning

Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Abilitytounderstandthecurrentlegalissuestowardsinformationsecurity.

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III Year B.Tech.ISem	L	T/P/D	C
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OPEN ELECTIVE III
(R18A1253)MANAGEMENT INFORMATION SYSTEMS

COURSEOBJECTIVES:

1) To understand the competitive advantage of using information systems in the organization for the needful assistance in decision makingandmanagement.
2) To learn how to plan for information systems&implementation
3) To study about security aspects of informationsystems

UNIT-I:
Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.
Case Study: MIS at any business establishment.

UNIT-II:
Business Applications of Information Systems : E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.
Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III:
Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.
Effectiveness of MIS: A Case Study.

UNIT-IV:
Building of Information Systems: System Development Stages, System Development Approaches.
Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.
Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V:
Introduction to Cyber Crime : Cyber Crime Defination and orgin of the word,cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and indian ITA 2000,Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOKS

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCES:

1. Nina Godbole &SunitBelapure“ Cyber Security” Wiley india2012.
2. Jawadekar, MIS Text and Cases, TMH,2012.
3. Dr Milind M Oka “Cases in Management Information system ‘Everest,2012.
4. A K Gupta, Sharma “Management of Systems” Macmillan,2012.
5. Sandra Senf “Information Technology Control and Audit” 3e, CRC Press,2012.
6. Apache OFBiz for Ecommerce and ERP -https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) -https://magento.com/
8. Adempiere – ERP :http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS -http://www.lumina.com
10. OpenRules – Business Rules and Decision Management system - http://openrules.com/

COURSE OUTCOMES:

1) Ability to apply Concepts & applications of Management InformationSystems.
2) Ability to perform Information Systems Planning &Implementations.
3) Ability to adapt Cyber crime and information securityprocedures.

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III Year B.Tech.ISem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE II
(R18A0552) INTRODUCTION TO JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

1) to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance andpolymorphism;
2) use data types, arrays andstrings;
3) implement error-handling techniques using exceptionhandling,
4) create and event-driven GUI using AWTcomponents.

UNIT I: OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.
Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, BufferedReader class, Scanner class, StringTokenizer class, inner class.

UNIT II: Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes andmethods.
Polymorphism – Dynamic binding, method overriding, abstract classes and methods.
Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.
Packages- Defining, creating and accessing a package, importing packages.

UNIT III: Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.
Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV: Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Event Handling: Events, Handling mouse and keyboard events, Adapter classes.
Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V: GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics.
AWT controls: Labels, button, text field, check box, and graphics.
Layout Manager – Layout manager types: border, grid and flow.

Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt,TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearsoneduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.NageswaraRao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel,PHI
2. Object Oriented Programming through Java, P. Radha Krishna, UniversitiesPress.
3. Thinking in Java, Bruce Eckel,PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford UniversitiesPress.

COURSE OUTCOMES:

1) An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high levellanguage;
3) An appreciation of the principles of object orientedprogramming;
4) An awareness of the need for a professional approach to design and the importance of good documentation to the finishedprograms.
5) Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular softwareproblem.
6) Be able to make use of members of classes found in the JavaAPI.
7) Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set ofrequirements.
8) Able to develop applications using Applet, awt and GUIProgramming.

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OPEN ELECTIVE II
(R18A01252) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1) Understanding the specific roles within a software organization as related to project andprocess management
2) Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3) Understanding the basic steps of project planning, project management, quality assurance, and process management and theirrelationships

UNIT-I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases .

UNIT-III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

Flows of the Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, PragmaticPlanning.

UNIT-V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, "Software Project Management", 1998,PEA.
2. Henry, "Software Project Management", Pearson.

REFERENCE BOOKS:

1. Richard H.Thayer." Software Engineering Project Management", 1997, IEEE Computer Society.
2. Shere K.D.: "Software Engineering and Management", 1998,PHI.
3. S.A. Kelkar, "Software Project Management: A Concise Study",PHI.
4. Hughes Cotterell, "Software Project Management", 2e, TMH. 88 5. Kaeron Conway, "Software Project Management from Concept toD

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

1) Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion ofproject
2) Compare and differentiate organization structures and project structures.
3) Implement a project to manage project schedule, expenses and resource with the application of suitable project managementtools

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OPEN ELECTIVE II
(R18A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1) To know the basics of ERP
2) To understand the key implementation of ERP
3) To know the business modules of ERP
4) To evaluate the current and future trends inERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill,2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi,2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill,2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition,2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA,2001.

COURSE OUTCOMES:

1) To know the strategic importance of Enterprise ResourcePlanning
2) To Understand and implement ERP in various Sectors.

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OPEN ELECTIVE II

(R15A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

1) To learn about basis of NanoMaterials.
2) In this course we focus on synthetic aspects for the design of nanostructured materials.
3) We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructuredmaterials.
4) The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes(CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of thesenanostructures.
5) The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles,nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano-composites,

UNIT-II

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

Electrical properties: Switching glasses with nanoparticles, Electronic conduction with nano-particles.

Optical properties: Optical properties, special properties and the coloured glasses.

Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and MechanicalProperties.

UNIT–III Synthesis Routes: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV Tools to Characterize Nanomaterials: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT–V Applications of Nanomaterials: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1) Text Book of Nano Science and Nano Technology – B.S. Murthy, P.Shankar, Baldev Raj, B.B. Rath and James Munday, UniversityPress-IIM.
2) Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition,2012.
3) Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press2004.

REFERENCES BOOKS:

1) Nano: The Essentials by T. Pradeep, McGraw- HillEducation.
2) Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L.Schodek.
3) Transport in Nano structures- David Ferry, Cambridge University press2000
4) Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H.Carola.
5) Carbon Nanotubes: Properties and Applications- Michael J.O'Connell.
6) Electron Transport in Mesoscopic systems – S. Dutta, Cambridge Universitypress.
7) Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

COURSE OUTCOMES:

1) Will familiarize about the science of NanoTechnology.
2) Will demonstrate the preparation of NanoTechnology.
3) Will develop knowledge in characteristic Nano Technology &NanoMaterials.

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(R1A0587) Compiler Design Lab

Objectives:

- To provide an Understanding of the language translationpeculiarities by designing complete translator for an abstract mini language whose syntax by BNF notation in followinglines.

SOURCE (MINI) LANGUAGE (A Case Study)

Consider the following mini language, a simple procedural High Level Language, operating on integer data with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is defined by the following BNF grammar:

<program> ::=<block>
<block> ::= { <variable definition><slist> }
| { <slist> }
<variable definition> ::= int <vardeflist> ;
<vardeflist> ::=<vardec> | <vardec>, <vardeflist>
<vardec> ::=<identifier> | <identifier> [<constant>]
<slist> ::=<statement> |<statement> ; <slist>
<statement> ::=<assignment> | <ifstatement> | <whilestatement> | <block>
| <printstatement> |<empty>
<assignment> ::=< identifier>=<expression>
| <identifier> [<expression>] = [<expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
| if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist>enddo
<printstatement> ::= print{ <expression> }
<expression> ::=<expression><addingop><term> | <term> | <addingop><term>
<bexpression> ::=<expression><relop><expression>
<relop> ::=< | <= | = = | >= | > |!=
<addingop> ::= + | -
<term> ::=<term><multop><factor> | <factor>
<multop> ::= * | /
<factor> ::=<constant> | <identifier> |<identifier> [<expression>
| (<expression>)
<constant> ::=<digit> | <digit><constant>
<identifier> ::=<identifier><letterordigit> | <letter>
<letterordigit> ::=a|b|c|….|y|z
<digit> ::= 0|1|2|3|…|8|9
<empty> ::= has the obvious meaning

Comments : zero or more characters enclosed between the standard C/Java style comment brockets /*…*/. The language has the rudimentary support for 1-Dimensional arrays. Ex: int a[3] declares a as an array of 3 elements, referenced as a[0],a[1],a[2].

Sample Program written in this language is :

```
{
 int a[3],t1,t2;
t1=2;
a[0]=1; a[1]=2; a[t1]=3;
t2= -(a[2]+t1*6) / a[2]-t1);
if t2>5 then
print(t2);
else
 {
  int  t3;
  t3=99;
  t2=25;
   print(-11+t2*t3); /* this is not a comment on two lines */
}
 endif
}
```

1. Write a C Program to scan and count the number of characters, words, and line of a file.
2. Write a program for implementation of NFAs that recognize identifiers, constants, and operators of the minilanguage.
3. Write a program for the implementation of DFAs that recognize identifiers, constants, and operators of the minilanguage.
4. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonablevalue.
5. Implement the lexical analyzer using JLex, flex, flex or lex or other lexical analyzer generatingtools.
6. Design Predictive parser for the givenlanguage.
7. Design LALR bottom up parser for the abovelanguage.
8. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree or Three Addresscode.
9. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as targetcode.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows:

R specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc).
L specifies a numerical label (in the range 1 to 9999).
V specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

A specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:
LOAD A, R : Loads the integer value specified by A into register R.
STORE R, V : Stores the value in register R to variableV.
OUT R : Outputs the value in register R.
NEG R : Negates the value in register R.
ADD A, R : Adds the value specified by A to register R, leaving the result in register R.
SUB A, R : Subtracts the value specified by A from register R, leaving the result in register R.
MUL A, R : Multiplies the value specified by A by register R, leaving the result in register R.
DIV A, R : Divides register R by the value specified by A, leaving the result in register R.
JMP L : Causes an unconditional jump to the instruction with the labelL.
JEQ R, L : Jumps to the instruction with the label L if the value in register R is zero.
JNER, L : Jumps to the instruction with the label L if the value in register R is notzero.
JGE R, L : Jumps to the instruction with the label L if the value in register R is greater than or equal tozero.
JGT R, L : Jumps to the instruction with the label L if the value in register R is greater than zero.
JLE R, L : Jumps to the instruction with the label L if the value in register R is less than or equal to zero.
JLT R, L : Jumps to the instruction with the label L if the value in register R is less than zero.
NOP : Is an instruction with no effect. It can be tagged by alabel.
STOP : Stops execution of the machine. All programs should terminate by executing a STOP instruction.

RECOMMENDED SYSTEM / SOFTWARE REQUIREMENTS:

1. Intel based desktop PC with minimum of 166MHz or faster processor with at least 64 MB RAM and 100 MB free diskspace.
2. C ++ Compiler and JDK kit, Lex or Flex and YACC tools (Unix/Linux utilities)

USEFUL TEXT BOOKS / REFERECES / WEBSITES :

1. Modern compiler implementation in C, Andrew w.Appel, Revised Edn, Cambridge UniversityPress
2. Principles of Compiler Design. – A.V Aho, J.D Ullman ;PearsonEducation.
3. **lex&yacc**, -John R Levine, Tony Mason, Doug Brown;O'reilly.

4. **Compiler Construction**,-LOUDEN,Thomson.
5. Engineering a compiler – Cooper&Linda,Elsevier
6. Modern Compiler Design – Dick Grune,HenryE.Bal, Cariel TH Jacobs, WileyDreatech

Outcomes:

By the end of the semester the student will be able to

- Understand the practical approach of how a compiler isdesigned.
- Apply the techniques used in compilerconstruction.
- Construct components(few phase) of the compiler for the minilanguage

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(R18A0588) Python programming Lab

OBJECTIVES

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS:

Week 1:

A) Create a list and perform the following methods

1) insert() 2) remove() 3) append() 4) len() 5) pop() 6) clear()

B) Create a dictionary and apply the following methods

1) Print the dictionary items 2) access items 3) use get() 4)change values 5) use len()

C) Create a tuple and perform the following methods

1) Add items 2) len() 3) check for item in tuple 4)Access iems

Week 2:

A) Write a python program to add two numbers.

B) Write a python program to print a number is positive/negative using if-else.

C) Write a python program to find largest number among three numbers.

D) Write a python Program to read a number and display corresponding day using if_elif_else?

Week 3:

A) Write a program to create a menu with the following options

1. TO PERFORM ADDITITON 2. TO PERFORM SUBTRACTION
3. TO PERFORM MULTIPICATION 4. TO PERFORM DIVISION

Accepts users input and perform the operation accordingly. Use functions with arguments.

B) Write a python program to check whether the given string is palindrome or not.

C) Write a python program to find factorial of a given number using functions

D) Write a Python function that takes two lists and returns True if they are equal otherwise false

Week 4:

A) Write a program to double a given number and add two numbers using lambda()?

B) Write a program for filter() to filter only even numbers from a given list.

C) Write a program for map() function to double all the items in the list?

D) Write a program to find sum of the numbers for the elements of the list by using reduce()?

Week 5:

A) Demonstrate a python code to implement abnormal termination?

B) Demonstrate a python code to print try, except and finally block statements

C) Write a python program to open and write “hello world” into a file?

D) Write a python program to write the content “hi python programming” for the existing file.

Week 6:

A) Write a python program to get python version.

B) Write a python program to open a file and check what are the access permissions acquired by that file using os module?

C) Write a python program to display a particular month of a year using calendar module.
D) Write a python program to print all the months of given year.

Week 7:

A) Write a python program to print date, time for today and now.
B) Write a python program to add some days to your present date and print the date added.
C) Write a python program to print date, time using date and time functions
D) Write a python program which accepts the radius of a circle from user and computes the area (use math module).

Week 8:

A) Write a python program to create a package (college),sub-package (alldept),modules(it,cse) and create admin and cabin function to module?
B) Write a python program to create a package (Engg), sub-package(years),modules (sem) and create staff and student function to module?

Week 9:

A) Write a python Program to display welcome to MRCET by using classes and objects.
B) Write a python Program to call data member and function using classes and objects.
C) Write a program to find sum of two numbers using class and methods
D) Write a program to read 3 subject marks and display pass or failed using class and object.

Week 10:

A) Using a numpy module create an array and check the following:
1. Type of array 2. Axes of array
3. Shape of array 4. Type of elements in array

B) Using a numpy module create array and check the following:
1. List with type float 2. 3*4 array with all zeros
3. From tuple 4. Random values

C) Using a numpy module create array and check the following:
1. Reshape 3X4 array to 2X2X3 array 2. Sequence of integers from 0 to 30 with steps of 5
3. Flatten array 4. Constant value array of complex type

Week 11:

A) Write a python program to concatenate the dataframes with two different objects.
B) Write a python code to read a csv file using pandas module and print the first and last five lines of a file.

Week 12:

A) Write a python code to set background color and pic and draw a circle using turtle module
B) Write a python code to set background color and pic and draw a square and fill the color using turtle module
C) Write a python code to perform addition using functions with pdb module.

PLATFORM NEEDED Python 3 interpreter/Anaconda 3 or above for Windows/Linux

OUTCOMES Upon completion of the course, students will be able to

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python

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(R18A0006) Technical Communication and Soft Skills

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mockinterviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professionalfields.
- To improve language proficiency and develop the required professionalskills.
- To equip students with tools to organize, comprehend, draft short and long forms of technicalwork.

The textbook prescribed for study is a manual that has been compiled by the department of English to meet the academic and professional needs of the students.

UNIT I – Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT 2 - Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT 3 – Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT 4 - Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT 5 - Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCES:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York,2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York,2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London,2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN0402213)

OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks moresuccessfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professionalwriting.
- Students will also be able to adhere to ethical norms of scientificcommunication.
- Students will be able to strengthen their individual and collaborative workstrategies

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(R18A0517) Web Technologies

Objectives:

- Giving the students the insights of the Internet programming and how to design and implement complete applications over theweb.
- It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts,Client-Side
- Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to webapplications,
- Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

UNIT I:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.

HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) & its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (onclick, onsubmit, etc.,) and Form Validation.

UNIT II:

Introduction to XML: Document type definition, XML Schemas, Presenting XML , Introduction to XHTML, Using XML Processors: DOM and SAX.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Cookies and Session Tracking.

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database from a Servlet. Introduction to struts frameworks.

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSP Declarations, Directives, Expressions, Scripting Elements, implicit objects. **Java Beans:** Introduction to Beans, Deploying java Beans in a JSP page.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNITs 1,2)
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITs 3, 4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson Education,2007.
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/ Pearson Education Asia.
3. Jakarta Struts Cookbook, Bill Siggelkow, S P D O' Reilly for chap8.
4. March's beginning JAVA JDK 5, Murach,SPD
5. An Introduction to WEB Design and Programming –Wang-Thomson
6. PHP: The Complete Reference Steven HolznerTataMcGraw-Hill.

Course Outcomes:

- Have understanding of designing a static web page and basics ofinternet.
- Gain knowledge of client side scripting, validation of forms and Strutsprogramming
- Have understanding of server side scripting with PHP language
- Have understanding of what is XML and how to parse and use XML Data withJava
- To introduce Server side programming with Java Servlet, JSP andJDBC.

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III Year B. Tech CSE -IISem

L	T/P/D	C
3	-/-/-	3

(R18A1207) Mobile Application Development

OBJECTIVES

- Mobile Application Development course exposes the students to essentials of mobile appsdevelopment.
- The core modules of this subject include designing, developing, testing, signing, packaging and distributing high quality mobileapps.
- ThiscourseaimstoteachmobileappdevelopmentusingAndroidasthedevelopment platform.

UNIT I:

Introduction to Mobile A brief history of Mobile, The Mobile Ecosystem, Why Mobile?, Types of Mobile Applications, Mobile Information Architecture, Mobile Design, Mobile 2.0, Mobile Web development, Small Computing DeviceRequirements.

J2ME: Overview The World of Java, Inside J2ME, J2ME Architecture, MIDlet Programming, J2ME Wireless Toolkit, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite

UNIT II:

Introduction to Android: History of Android, Introduction to Android, Operating Systems, Android Development Tools, AndroidArchitecture.

UNIT III:

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project –Hello Word, run on emulator, Deploy it on USB-connected Androiddevice

UNIT IV:

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.

UNIT V:

Database: Understanding of SQLite database, connecting with the database.

TEXTBOOKS:

1. J2ME:TheCompleteReference,JamesKeogh,TataMcGrawHill
2. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning,2013.
3. Lauren Darcey and Shane Conder, —Android Wireless Application Development , Pearson Education, 2nd ed.(2011)

REFERENCE BOOKS:

1. RetoMeier,—ProfessionalAndroid2ApplicationDevelopment ,WileyIndiaPvt Ltd
2. MarkLMurphy,—BeginningAndroid ,WileyIndiaPvtLtd
3. Sayed Y Hashimi and Satya Komatineni, —Pro Android , Wiley India Pvt Ltd. devloper.android.com(web)
4. AndroidApplicationDevelopmentAllinoneforDummiesbyBarryBurd,Ed:I
5. TeachYourselfAndroidApplicationDevelopmentIn24Hours,Edition:I, Publication:SAMS

Outcomes:

- Uponcompletionofthiscourse,studentshallbeableto:
- Appreciate the Mobilitylandscape
- FamiliarizewithMobileappsdevelopmentaspects
- Design and develop mobile apps, using Android as development platform, with key focus on user experience design, native data handling and background tasks andnotifications.
- Performtesting,signing,packaginganddistributionofmobileapps.
- Thestudentcandesignanddevelopmobileapplicationusing J2ME

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III Year B. Tech CSE -ISem

L	T/P/D	C
3	-/-/-	3

(R18A0518) Computer Networks

Objectives:

- To introduce the fundamental types of computernetworks.
- To demonstrate the TCP/IP & OSI model merits &demerits.
- To know the role of various protocols inNetworking.

UNIT - I:

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet.

Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II:

Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols

Multiple Access Protocols - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion controlalgorithms,

IP addresses, CIDR, Subnetting, SuperNetting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV:

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT - V: Application Layer- Introduction, providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; BA algorithm,

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, PearsonEducation.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, PearsonEducation.

Outcomes:

- Students should be understand and explore the basics of Computer Networks and VariousProtocols.
- Student will be in a position to understand the World Wide Webconcepts.
- Students will be in a position to administrate a network and flow of information further
- Student can understand easily the concepts of network security,Mobile

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III Year B. Tech CSE –IISem

L	T/P/D	C
3	-/-/-	3

Professional Elective-II
(R18A0519) Csomputer Graphics

Objectives

- To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
- To make the student present the content graphically

Unit-1:

Introduction - History of computer graphics, applications, graphics pipeline, video-display devices, raster-scan systems, random scan systems, and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood fill algorithms.

Unit-2:

Introduction to OpenGL - OpenGL architecture, primitives and attributes, simple modeling and rendering of two- and three-dimensional geometric objects, indexed and RGB color models, frame buffer, double buffering, 2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to viewport coordinate transformation, viewing functions.

Unit-3:

Geometric transformations- Homogeneous coordinates, affine transformations (translation, rotation, scaling, shear), concatenation, matrix stacks and use of model view matrix in OpenGL for these operations.

Unit-4:

Viewing - Classical three dimensional viewing, computer viewing, specifying views, parallel and perspective projective transformations; Visibility- z-Buffer, BSP trees, Open-GL culling, hidden-surface algorithms.

Shading - Light sources, illumination model, Gouraud and Phong shading for polygons. Rasterization- Line segment and polygon clipping, 3D clipping, scan conversion.

Unit-5:

Representation and Visualization- Bezier curves and surfaces, B-splines, visualization, interpolation, marching squares algorithm. Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

Text Books:

1. Edward Angel, Interactive Computer Graphics. A Top-Down Approach Using OpenGL (fifth Edition), Pearson Education, 2008.
2. Donald Hearn and Pauline Baker, Computer Graphics with OpenGL (third edition), Prentice Hall, 2003.
3. F. S. Hill Jr. and S. M. Kelley, Computer Graphics using OpenGL (third edition), Prentice Hall, 2006.
4. Peter Shirley and Steve Marschner, Computer Graphics (first edition), A. K. Peters, 2010 Web Resources: http://www.graphicsforum.in This website contains several resources relevant to this course; May be beneficial to both students / instructors.

Outcomes:

- Students can animate scenes entertainment.
- Will be able to work in computer aided design for content presentation..
- Better analogy data with pictorial representation.

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III Year B. Tech CSE -IISem

L	T/P/D	C
3	-/-/-	3

Professional Elective-II
(R18A0520) Distributed Systems

Objectives:

- To learn the principles, architectures, algorithms and programming models used in distributedsystems.
- To examine state-of-the-art distributed systems, such as Google FileSystem.
- To design and implement sample distributedsystems.

UNIT I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges.

System models: Introduction, Architectural and Fundamental models, networking and Internetworking.

UNIT II

Time and Global States: Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, globalStates.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and relatedproblems.

UNIT III

Inter process Communication: Introduction ,The API for the Internet Protocols, External Data Representation and Marshalling, Client –Server Communication, Group Communication, Case Study: IPC inUNIX.

Distributed Objects and Remote Invocation: Introduction, Communication between distributed objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT IV

Distributed File Systems: Introduction, File Service Architecture, Case Study: Sun Network File System

Name Services: Name Services: Introduction, Name Services and the Domain Name System, Case study of the Global Name Service

Distributed Shared Memory: Introduction, Design and Implementation issues, Sequential consistency, Release consistency , Other consistency models.

UNIT V

Transactions and Concurrency control: Introduction, Transactions, Nested Transactions, Locks, optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transactionrecovery.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2009.

REFERENCES:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition,PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor &Fransis Group,2007.

Outcomes:

- Students will identify the core concepts of distributed systems: the way in which several machines orchestrate to correctly solve problems in an efficient, reliable and scalableway.
- Students will examine how existing systems have applied the concepts of distributed systems in designing large systems, and will additionally apply these concepts to develop sample systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE - II Sem

L	T/P/D	C
3	-/-/-	3

(R18A0521) CYBER SECURITY
(Professional Elective 2)

Course objectives:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

Course Outcomes: The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy.

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.
Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data

linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley

2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&FGroup.

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III Year B.Tech. II Sem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE III

(R18A0452) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

1) To study overview of Embedded Systems, Robots, Microprocessors &Microcontrollers.
2) To study in detail about Robotics andsensors.
3) To study about AVR RISC Microcontroller architecture indetail.
4) To study about ARM Processor in detail.
5) To study about Artificial Intelligence inRobotics.

UNIT -I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

The AVR RISC microcontroller architecture: Introduction , AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory ,EEPROM ,I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM Processor: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

[1] Subrata Ghoshal, "Embedded Systems & Robots", CengageLearning
[2] Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education,India2003.
[3] ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc.,2007

REFERENCE BOOKS:

[1] M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.

[2] Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design &Programming", Dreamtech

[3] Microcontrollers and applications, Ajay V Deshmukh ,TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to

1) Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) Understand in detail about Robotics andsensors.
3) Understand AVR RISC Microcontroller architecture indetail.
4) Understand about ARM Processor indetail.
5) Understand about Artificial Intelligence inRobotics.

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III Year B.Tech.IISem	L	T/P/D	C
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OPEN ELECTIVE III

(R18A0453) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

1) To study IoT NetworkingCore
2) To study IoT related networkfundamentals
3) To study IoTArchitecture.
4) To study IoT Application Developmentprocedure
5) To study various case studies and IoTapplications.

Unit 1: The IoT Networking Core :

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

Unit 2: Network Fundamentals:

Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

Unit 3: IoT Architecture:

History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis. The Architecture The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

Unit 4: IoT Application Development:

Application Protocols MQTT, REST/HTTP, CoAP, MySQL.

Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Developmenttools

Unit 5: Case Study & IoT Applications:

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, RiverPublishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, MorganKuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, HuanshengNing
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , ArshdeepBahga
3. Designing the Internet of Things , Adrian McEwen (Author), HakimCassimally
4. Asoke K Talukder and Roopa R Yavagal, “Mobile Computing,” Tata McGraw Hill,2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6thEdition

COURSE OUTCOMES:

At the end of the course, the student will be able to

1) Understand IoT NetworkingCore
2) Understand IoT related networkfundamentals
3) Understand IoTArchitecture.
4) Understand IoT Application Developmentprocedure
5) Understand various case studies and IoTapplications.

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III Year B.Tech -IISem

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3	-/-/-	3

(OPEN ELECTIVE - III)

(R18A1253) SOFTWARE TESTING TECHNIQUES

COURSE OBJECTIVES:

1) Knowing the concepts of Software Engineering and software development lifecycle.
2) Understanding the foundations, techniques, and tools in the area of software testing and its practice in theindustry.
3) Learning the functional aspect of the various testingtechniques.
4) Knowledge of the creation of test cases and usage of testingtools.

UNIT-I INTRODUCTION

Software, Software Engineering, Process Models: Waterfall Model, Spiral Model, Prototyping, V Model. Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester – Independent Verification and Validation.

UNIT - II SOFTWARE TESTING REQUIREMENTS

Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews: Peer Review – Walkthrough - Inspection - Checklists of Review Process - ReviewLog.

UNIT - III TESTING TECHNIQUES

White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision/Branch Coverage – Basic Path Testing – Control Flow Graph Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques: Boundary Value Analysis – Equivalent Class Partition – Cause-Effect Analysis – Decision Table – State Transition Table – Pair Wise Testing – UseCaseTesting.

UNIT - IV TESTING TYPES

Unit Testing, Functional Testing: Smoke Testing – Integration, System Testing, User Acceptance Testing - Non Functional Testing:– Performance Testing – Recovery Testing – Security Testing – Compatibility Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - Data ware House Testing and Business Intelligence Testing – SOA Testing - MobileTesting.

UNIT - V TEST CASE DESIGN

Definition of Test Case - Standards, Guidelines and Naming Conventions – Characteristics

of Good Test Cases – Test Case templates – Creation of Test Case – Requirement Coverage –Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting of Test Execution – Definition of Risk - Risk Based Testing Approach.
Overview of Testing Tools like Winrunner, Loadrunner, Selenium, JMeter.

TEXT BOOKS :

1. Software Testing Techniques – BorisBeizer, Dreamtech, secondedition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad,Dreamtech.
3. S.Subashni, N.Satheesh Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, ”Software Testing”, Umayam Publications , First edition,2013.

REFERENCE BOOKS:

1. Srinivasan Desikan, GopalaswamyRamesh,”Software Testing: Principles and Practice”, Pearson Education India, First Impression 2006.
2. Software Testing Techniques –SPD(Oreille)
3. Software Testing Concepts and Tools:P.NageshwarRao,dreamtechPress.
4. Art of Software Testing – Meyers, JohnWiley.
5. Software Testing in the Real World – Edward Kit,Pearson.

COURSE OUTCOMES:

1) Analyze the strategies for softwaretesting.
2) Identify the issues in test management and testingactivity.
3) Apply the suitable testing strategy for a given application.
4) Development of test cases and selection of appropriate testingtool.

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III Year B.Tech.IISem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE III
(R18A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

1) To facilitate the understanding of Quality Management principles andprocess.
2) To understand Customer focus, Employee focus and their involvement and Supplier Management.

UNIT – I

Introduction, The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and AcceptanceSampling.

UNIT -II

Customer Focus and Satisfaction: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q-90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing thesystem.

TEXT BOOK:

- Total Quality Management / Joel E. Ross/Taylor and FranscisLimited
- Total Quality Management/P. N.Mukherjee/PHI

REFERENCE BOOKS:

- Beyond TQM / RobertL.Flood
- Total quality management by PaneerSelvam
- Statistical Quality Control / E.L.Grant.

- Total Quality Management:A Practical Approach/H.Lal
- Quality Management/Kanishka Bedi/Oxford UniversityPress/2011
- Total Engineering Quality Management/SunilSharma/Macmillan

COURSE OUTCOMES:

1) The student would be able to apply the tools and techniques of quality management to manufacturing and servicesprocesses.
2) To give the students an overview of TQM, various Quality aspects and importance of Top Management Commitment in any organization for maintaining product / services quality.

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	3	-/-/-	3

OPEN ELECTIVE III
(R18A0251) ELECTRICAL SYSTEMS & APPLICATIONS

COURSE OBJECTIVES:

1) To introduce the fundamental concepts of electro mechanical energyconversion
2) To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumerIndustry

UNIT- 1: Electrical System Components

LT system wiring components, Selection of Cables, Wires, Switches, Distribution Box, Metering System, Tariff structure, Protection Components- Fuse, MCB, MCCB, ELCB, Inverse current characteristics, Symbols, Single Line Diagram (SLD) of a wiring system, Contactor, Isolator,Relays, MPCB, Electric shock and Electrical safety practices.

UNIT- 2: Residential and Commercial Electrical Systems

Types of residential and commercial wiring systems, general rules and guidelines for installation. Load calculation and sizing of wire, rating of main switch, distribution board and protection devices. Earthing system calculations.Requirements of commercial installation-deciding lighting scheme and number of lamps, earthing of commercial installation, selectionand sizing of components.

UNIT- 3: Illumination Systems

Understanding various terms related to light intensity, Lumens, candle power, lamp efficiency,specificconsumption.Various illumination schemes- Incandescent lamps, modern luminaries like CFL, LED andtheir operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

UNIT-4: Industrial Electrical Systems

UPS System-Types, Principle of operation.Battery banks, sizing theUPS and Battery Banks, Selection of UPS and Battery Banks.

UNIT-5: Single Phase AC Motor and Special Motors

Constructional features, Principle of operation, Characteristics, Speed control and Applications of Single phase AC motor, Stepper motor, Brushless DC motor and Universal motor(Qualitative Treatment only).

TEXT BOOKS

1. S. L. Uppal and G. C. Garg, “Electrical Wiring, Estimating & Costing”, Khannapublishers, 2008.
2. K. B. Raina, “Electrical Design, Estimating & Costing”, New age International,2007.
3. H. Joshi, “Residential Commercial and Industrial Systems”, McGraw Hill Education, 2008.

REFERENCE BOOKS:

1. N.V. Suryanarayana, *"Utilization of Electrical Power including Electric drives and Electric traction"*, New Age International (P) Limited Publishers, 1stEdition,1994.
2. E. Open Shaw Taylor, *"Utilization of Electric Energy"*, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

1) Maintain/Troubleshoot various lamps and fittings inuse.
2) Design Illumination systems for variousapplications.
3) Utilize effectively the electrical systems inindustries.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech.IISem

L	T/P/D	C
3	-/-/-	3

OPEN ELECTIVE III

(R18A0554) OPERATING SYSTEM CONCEPTS

OBJECTIVES:

- To learn the fundamentals of OperatingSystems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporaryOS
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols

To know the components and management aspects of concurrency management

Unit I:

Introduction, objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

Unit-II:

Process Management:

Process concept, Process states, threads, **CPU Scheduling** - Scheduling algorithms, multiple processors and real time scheduling. **Process synchronization** – Critical section problems, Peterson's Solution, semaphores, monitors.

Unit-III:

Memory Management:

Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation. **Virtual memory** – Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

Unit-IV: **File Management**: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

Unit-V:

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.

Dead locks: Characterization, Dead lock Prevention, Dead lock Avoidance, Dead lock Detection and Recovery.

Text Book:

1. Operating Systems Concepts –AvilSilberschatz j, Peter Galvin, GreyGagne

Reference:

1. Modern Operating Systems –Andrew S. Tanenbaum,PHI

2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall ofIndia

OUTCOMES:

At the end of the course the students are able to:

- Create processes andthreads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, ResponseTime.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the accesstime.
- Design and implement file managementsystem.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/Ocontrollers.

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(R18A0589) Web Technologies Lab

Objectives:

- To enable the student to program web applications using the following technologies HTML, Javascript ,XML, PHP ,Tomcat Server, Servlets ,JSP, Beans andStruts.

Week 1

Design the following static web pages required for an online book store web site.

1) HOME PAGE: The static home page must contain three**frames**.

2) LOGIN PAGE

3) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in atable.

4) REGISTRATIONPAGE

Week 2

Develop and demonstrate the usage of inline, internal and external style sheet using CSS.

Week 3

Write JavaScript to validate the following fields of the Registration page.

1. First Name (Name should contains alphabets and the length should not be less than 6 characters).

2. Password (Password should not be less than 6 characterslength).

3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)

4. Mobile Number (Phone number should contain 10 digitsonly).

5. Last Name and Address (should not beEmpty).

Week 4

Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on Display Date button using onclick( ) function
Output: Display **date** in thetextbox

b) Input: A number n obtained using**prompt**
Output: **Factorial** of n number using **alert**

Week 5

a) Input: A number n obtained using**prompt**
Output: A **multiplication table** of numbers from 1 to 10 of n using **alert**

b) Input: A number n obtained using **prompt** and add another number using**confirm**
Output: **Sum** of the entire n numbers using **alert**

Week 6

Write an HTML page that contains a selection box with a list of 5 countries. When the user

selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

Week 7

Write an XML file which will display the Book information which includes the following:

1) Title of thebook
2) AuthorName
3) ISBN number
4) Publishername
5) Edition
6) Price

Write a **Document Type Definition (DTD)** to validate the above XML file. Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remainingcolumns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically

Week 8

Develop and demonstrate PHP Script for the following problems:

a) Write a PHP Program to display current Date, Time andDay.

b) Write a PHP Script to check whether the given number is Palindrome ornot

c) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit the site” message, where <name> should be replaced with the entered name. Otherwise it should send“Welcome <name> to this site” message.

Week 9

Implement the following web applications using Servlets

(i) A web application that takes a name as input and on submit it shows a hello <name> page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name > message with the duration of usage (hint: Use session to store name and time).

(ii) Write a PHP Program to display current Date, Time andDay.

(iii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit the site” message, where<name>shouldbereplacedwiththeenteredname.Otherwiseitshouldsend“Welcome <name> to this site” message.

(iv) A web application that lists all cookies stored in the browser on clicking “List Cookies” button. Add cookies ifnecessary.

Week 10

Execute simple queries with Database using (a) PHP, (b) Servlets

Week 11

Implement the following web applications using JSP

(i) Write a PHP Program to display current Date, Time andDay.

(ii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit the site" message, where<name>shouldbereplacedwiththeenteredname.Otherwiseitshouldsend"Welcome <name> to this site" message.

(iii) Write a program for deploying **Java Beans** in a JSPpage.

Week 12

Write a program to design a simple calculator using (a) JavaScript (b) PHP (c) Servlet and (d) JSP.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford UniversityPress
2. The Complete Reference PHP — Steven Holzner, TataMcGraw-Hill

REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WileyDreamtech
2. Java Server Pages —Hans Bergsten, SPDO'Reilly
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon DuckettWROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition,Pearson.
6. Internet and World Wide Web — How to program, Dietel and Nieto,Pearson.

Outcomes:

- Use WAMP Stack for webapplications
- Use Tomcat Server for Servlets andJSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and getresults
- Parse XML files using Java (DOM and SAXparsers)

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(R18A1282) Mobile Application Development Lab

List of Experiments

1. Installation of Java WirelessToolkit(J2ME)
2. Development Of Hello WorldApplication
3. Development of Menu CreationApplication
4. Generation of Menu Events HandlingApplication
5. Development of Slide ShowApplication
6. Generation of Image Slide Show
7. Development of Quiz & RMSApplication
8. Application for InputChecking
9. Generation of BarGraph
10. Generation of PieChart
11. Client Server App using Datagram

12Login using HttpConnection

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(R18A0007) Indian Constitution

Introduction

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

Objectives:

- To enable the students to understand the constitution's origin and itspower.
- To enable the students to analyze the politicalprinciples.
- To enable the students to be aware of their fundamental rights andduties.

The following course content is prescribed for this course.

UNIT –I

Meaning of constitution law and constitutionalism, Historical perspective of the constitution of India ,Salient features and characteristics of the constitution of India

UNIT –II

Scheme of fundamental rights,The scheme of the fundamental duties and its legal status,The Directive Principles of State Policy- its importance and implementation

UNIT –III

Federal structure and distribution of legislative and financial powers between the Union and the States,Parliamentary Form of Government in India-the constitution powers and status of the president of India,Amendment of the Constitutional Powers and Procedure

UNIT –IV

The historical perspectives of the constitutional amendments in India.Emergency provisions: National Emergency, President Rule, Financial Emergency,Localself government-Constitutional scheme inIndia

UNIT –V

Scheme of fundamental Right to Equality,Scheme of fundamental Right to certain Freedom under Article 19,Scope of the Right to Life and Personal Liberty under Article 21

OUTCOMES:

Students will be able to:

- improve their knowledge about Indianconstitution
- Value their identity and exercise their fundamentalrights.
- Understand how differently government bodiesfunction.

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(R18A0522) Software Testing Methodologies

Course Outcomes:

- Ability to apply the process of testing and various methodologies in testing for developedsoftware.
- Ability to write test cases for given software to test it before delivery to the customer.

UNIT – I: Introduction:-Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs. .

UNIT – II: Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, Control-flow Graph ,path sensitizing, path instrumentation, application of path testing. Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT – III: Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-IV: Paths, Path products and Regular expressions:-path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection. Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

UNIT – V: State, State Graphs and Transition testing:– state graphs, good & bad state graphs, state testing, Testability tips. Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. Basics of Regression Testing(RTS)

TEXT BOOKS:

- Software Testing techniques – Boris Beizer, Dreamtech, secondedition.
- Software Testing Tools – Dr.K.V.K.K.Prasad,Dreamtech.

REFERENCE BOOKS:

- The craft of software testing – Brian Marick, PearsonEducation.
- Software Testing,3rd edition,P.C. Jorgensen, Aurbach Publications (Dist.bySPD).
- Software Testing, N.Chauhan, Oxford UniversityPress.
- Introduction to Software Testing, P.Ammann&J.Offutt, CambridgeUniv.Press.
- Effective methods of Software Testing, Perry, John Wiley, 2nd Edition,1999.

- Software Testing Concepts and Tools, P.Nageswara Rao, dreamtechPress.
- Software Testing, M.G.Limaye,TMH.
- Software Testing, S.Desikan, G.Ramesh,Pearson.
- Foundations of Software Testing, D.Graham& Others, CengageLearning.
- Foundations of Software Testing, A.P.Mathur,Pearson.

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3 -/-/- 3

(R18A0523) Cloud Computing

Course Objectives:

- To explain the evolving computer model called cloudcomputing.
- To introduce the various levels of services that can be achieved bycloud.
- To describe the security aspects incloud.

UNIT- I

Systems Modeling :**Distributed System Models and Enabling Technologies**- Scalable Computing over the Internet- System Models for Distributed and Cloud Computing-Software Environments for Distributed Systems and Clouds-- Performance, Security, and EnergyEfficiency

Computer Clusters for Scalable Parallel Computing: Clustering- Clustering for Massive Parallelism-Computer Clusters and MPP Architectures-Design Principles of Computer Clusters-Cluster Job and Resource Management.

UNIT- II

Virtualization: Virtual Machines and Virtualization of Clusters and Data Centers-Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms-Virtualization of CPU, Memory, and I/O Devices-Virtual Clusters and Resource Management-Virtualization for Data-Center Automation

UNIT- III

Foundations: Introduction to Cloud Computing- Migrating into a Cloud-The Enterprise Cloud Computing Paradigm.

UNIT- IV

Infrastructure as a Service (IAAS) & Platform (PAAS): Virtual machines provisioning and Migration services-On the Management of Virtual machines for Cloud Infrastructures-Aneka—Integration of Private and Public Clouds

UNIT- V

Software as a Service (SAAS) &Data Security in the Cloud:

Google App Engine – Centralizing Email Communications- Collaborating via Web-Based Communication Tools-An Introduction to the idea of Data Security- The Current State of Data Security in the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

TEXT BOOKS:

1. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India2012.
2. Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S.TanuraiSelvi, TMH, 2012.
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August2008.

Outcomes:

- Ability to understand the virtualization and cloud computingconcepts.

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(R18A0524)Data Warehousing and Data Mining

Objectives:
Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

UNIT-I
Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP andHOLAP.

UNIT-II
Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.
Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration &Transformation, Data Reduction, Discretization and Concept Hierarchy Generation**.**

UNIT-III
Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent ItemSet.

UNIT-IV
Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

UNIT-V

Clustering: Clustering Overview,A Categorization of Major ClusteringMethods, Partitioning Methods, Hierarchical Methods, Partitioning Clustering-K-Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Key Issues in Hierarchical Clustering, Strengths and Weakness,Outlier Detection.

TEXT BOOKS:

1) Data Mining- Concepts and -1.chniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition,2006.
2) Introduction to Data Mining, Psng-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Educatior.

REFERENCE BOOKS:

1) Data Mining Techniques, Arun KPujari, 3rd Edition, UniversitiesPress.
2) Data Warehousing Fundament's, PualrajPonnaiah, Wiley StudentEdition.
3) The Data Warehouse Life CycleToolkit — Ralph Kimball, Wiley StudentEdition.
4) Data Mining, VikaramPudi, P Rddha Krishna, Oxford UniversityPress

Outcomes:

- Student should be able to understand why the data warehouse in addition to database systems.
- Ability to perform the pre-processing of data and apply mining techniques onit.
- Ability to identify the association rules, classification and clusters in large datasets.
- Ability to solve real world problems in business and scientific information using data mining

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(R18A0525) LINUX Programming

Objectives:

- To develop the skills necessary for Unix systems programming including file system programming, process and signal management, and interprocesscommunication.
- To make effective use of Unix utilities and Shell scripting language such asbash.
- To develop the basic skills required to write network programs usingSockets.

UNIT I

Linux Utilities - File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Sed - Scripts, Operation and addresses. **Awk -** Execution, Fields and Records, Scripts, Operation, Patterns and Actions.

Shell programming with Bourne again shell(bash)- Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

UNIT II

Files and Directories- File Concept, File types, File System Structure, file metadata-Inodes, kernel support for files, system calls for file I/O operations- open, create, read, write, close, lseek, dup2,file status information-stat family, file and record locking-lockf and fcntl functions, file permissions - chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links – symlink, link, unlink.

Directories- Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Scanning Directories-opendir, readdir, closedir, rewinddir, seekdir, telldirfunctions.

UNIT III

Process – Process concept, Kernel support for process, process identification, process hierarchy, process states, process control - process creation, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, exec family.

Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, kill, raise , alarm, pause, abort, sleep functions.

UNIT IV

Interprocess Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, **pipes-**creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes

using FIFOs (Named pipes),differences between unnamed and named pipes, popen and pclose library functions.
Message Queues- Kernel support for messages, APIs for message queues, client/server example.
Semaphores - Kernel support for semaphores, APIs for semaphores.

UNIT V
Shared Memory- Kernel support for shared memory, APIs for shared memory, shared memory exampl . Comparison of IPC mechanisms
Sockets- Introduction to Berkeley Sockets, Client-Server model, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server program,.

TEXT BOOKS:
1. Unix System Programming using C++, T.Chan,PHI.
2. Unix Concepts and Applications, 4th Edition, SumitabhaDas,TMH,2006.
3. Unix Network Programming, W.R.Stevens,PHI

OUTCOMES:

1. Identify and use Linux utilities to create and manage simple file processingoperations
2. Develop shell scripts to perform more complextasks.
3. Illustrate file processing operations such as standard I/O and formattedI/O.
4. Generalize Signal generation and handling signals.
5. Develop client server Inter Process Communication (IPC)Mechanisms.
6. Illustrate multithreading concepts to reduce the wastage of CPUtime.

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Professional Elective-III
(R18A0526) Machine Learning

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machinelearning.

UNIT I

FOUNDATIONS OF LEARNING

Components of learning – learning models – geometric models – probabilistic models – logic models – grouping and grading – learning versus design – types of learning – supervised – unsupervised – reinforcement – theory of learning – feasibility of learning – error and noise – training versus testing – theory of generalization – generalization bound – approximation generalization trade off – bias and variance – learning curve

UNIT II

INTRODUCTION TO TECHNOLOGY LANDSCAPE

Linear classification – univariate linear regression – multivariate linear regression – regularized regression – Logistic regression – perceptron's – multilayer neural networks – learning neural networks structures – support vector machines – soft margin SVM – going beyond linearity – generalization and overfitting – regularization – validation.

UNIT III

DISTANCE-BASED MODELS

Nearest neighbor models – K-means – clustering around medoids – silhouttes – hierarchical clustering – k-d trees – locality sensitive hashing – non-parametric regression – ensemble learning – bagging and random forests – boosting – meta learning

UNIT IV

TREE AND RULE MODELS

Decision trees – learning decision trees – ranking and probability estimation trees – regression trees – clustering trees – learning ordered rule lists – learning unordered rule lists – descriptive rule learning – association rule mining – first-order rulelearning

UNIT V

REINFORCEMENT LEARNING

Passive reinforcement learning – direct utility estimation – adaptive dynamicprogramming – temporal-difference learning – active reinforcement learning – exploration – learning an action utility function – Generalization in reinforcement learning – policy search – applications in game playing – applications in robot control.

Text Book:

1. P. Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge University Press, 2012. (UNIT-I toIV)
2. M. Mohri, A. Rostamizadeh, and A. Talwalkar, "Foundations of Machine Learning", MIT Press, 2012. (UNITV)

Reference Book:

1. Y. S. Abu-Mostafa, M. Magdon-Ismail, and H.-T. Lin, "Learning from Data", AMLBook Publishers,2012.
2. K. P. Murphy, "Machine Learning: A probabilistic perspective", MIT Press,2012.
3. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer,2007.
4. T. M. Mitchell, "Machine Learning", McGraw Hill,1997.
5. S. Russel and P. Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, Prentice Hall,2009.

Course outcomes:

At the end of the course students should be able to

- Explain theory underlying machinelearning
- Construct algorithms to learn linear and non-linear models
- Implement data clusteringalgorithms
- Construct algorithms to learn tree and rule-basedmodels
- Apply reinforcement learningtechniques

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3 -/-/- 3

Professional elective-III
(R18A0527) Mobile Computing

Course Objectives:

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSMprotocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data deliverymodels.
- To understand the ad hoc networks and relatedconcepts.
- To understand the platforms and protocols used in mobileenvironment.

UNIT - I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT – II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT – III

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for MobileNetworks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT - IV

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

UNIT - V

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition,2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN:0195686772.

REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition,2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct2004.

Course Outcomes:

- Able to think and develop new mobileapplication.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/oralgorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobileenvironment

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3 -/-/- 3

Professional elective-III
(R18A0528) Service Oriented Architecture

OBJECTIVES:

- The student should be madeto:
- Learn XMLfundamentals.
- Be exposed to build applications based onXML.
- Understand the key principles behindSOA.
- Be familiar with the web services technology elements for realizingSOA.
- Learn the various web servicestandards.

UNIT I:

Introduction to XML :XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema X-Files.

UNIT II

Building XML- Based Application Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL
Formatting – Modeling Databases in XML.

UNIT III

Service oriented Architecture Characteristics of SOA, Comparing SOA with Client-Server and Distributed
architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

UNIT IV

Web Services Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message
Exchange Patterns – Orchestration – Choreography –WS Transactions.

UNIT V

Building SOA-Based Application Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines - Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE.

TEXTBOOKS:

1. Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002 2.Thomas Erl, "Service
Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

REFERENCES:

1. Frank P.Coyle, "XML, Web Services and the Data Revolution", Pearson Education,2002.
2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education,2005.
3. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect'sGuide",
Prentice Hall, 2004.
4. James McGovern,Sameer Tyagi, Michael E.Stevens, Sunil Mathew, "Java Web. Services Architecture",
Morgan Kaufmann Publishers, 2003.

OUTCOMES:

Upon successful completion of this course,

- Students will be able to: x Build applications based onXML.
- Develop web services using technologyelements.
- Build SOA-based applications for intra-enterprise and inter-enterpriseapplications.

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(R18A0590) Linux Programming Lab

Objectives:

- To write shell scripts to solve problems
- To implement some standard Linux utilities such as ls, cp etc using systemcalls.
- To develop network-based applications usingC.

List of Sample Problems:

Week 1:

Practice File handling utilities, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Week 2:

a) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. Whenever the argument is a file it reports no of lines present init.

b) Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

Week 3:

a) Write a shell script to list all of the directory files in adirectory

b) Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments toit.

c) Write a shell script to find factorial of a givennumber.

Week 4:

Write an awk script to count number of lines in a file that does not contain vowels

Write an awk script to find the no of characters ,words and lines in a file

Week 5:

Implement in c language the following Unix commands using system calls

a) cat b) ls c) Scanning Directories (Ex: opendir(),readdir(),etc.)

Week 6:

Write a C program that takes one or more file/directory names as command line input and reports following information

A) File Type B) Number OfLinks

C) Time of last Access D) Read, write and executepermissions

Week 7:

a) Write a C program to implement kill(), raise() and sleep()functions.

b) Write a C program to implement alarm(), pause() and abort()functions.

Week 8:

a) Write a C program to create child process and allow parent process to display "parent" and the child to display "child" on the screen

b) Write a C program to create zombieprocess

c) Write a C program to illustrate how an orphan process iscreated

Week 9:

a) Write a C program that illustrate communication between two process using unnamed pipes

b) Write a C program that illustrates communication between two process using named pipes orFIFO.

Week 10:

a) Write a C program for FileLocking.

b) Write a C program that receives a message from message queue and displaythem.

Week 11:

Write a C program that illustrates two processes communicating using Shared memory.

Week 12:

Write client server programs using c for interaction between server and client process using sockets

Outcomes:

- Ability to understand the Linuxenvironment
- Ability to perform the file management and multiple tasks using shell scripts in Linux environment.

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IV Year B. Tech CSE -ISem **L T/P/D C**

- -/3/- 1.5

(R18A0591) Software Testing Methodologies Lab

1. Write programs in „C‟Language to demonstrate the working of thefollowinga.constructs: i) do...while ii) while….do iii) if…else iv) switch v) for

2. —A program written in „C‟language for Matrix Multiplication fails Introspect the causes foritsfailureandwritedownthepossiblereasonsforitsfailure.

3. Take any system (e.g.ATMsystem) and study its system specifications and report the various bugs.

4. Write the test cases for any known application (e.g. Bankingapplication)
5. Write the test cases forGMAIL

6. Write the test cases for FACEBOOK,TWITTER etc.,

7. Create a test plan document for any application (e.g. Library Management System)

8.Study of any web testing tool (e.g.Selenium)

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3 -/-/- 3

(R18A0529) Big-Data Analytics

UNIT I

INTRODUCTION TO BIG DATA AND ANALYTICS

Classification of Digital Data, Structured and Unstructured Data - Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Why Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments - Basically Available Soft State Eventual Consistency - Top AnalyticsTools

UNIT II

INTRODUCTION TO TECHNOLOGY LANDSCAPE

NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

UNIT III

INTRODUCTION TO MONGODB AND CASSANDRA

MongoDB: Why Mongo DB - Terms used in RDBMS and Mongo DB - Data Types - MongoDB Query Language Cassandra: Features - CQL Data Types – CQLSH – Keyspaces - CRUD Operations –
Collections - Using a Counter - Time to Live - Alter Commands - Import and Export - Querying System Tables

UNIT IV

INTRODUCTION TO MAPREDUCE PROGRAMMING AND HIVE

MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression Hive: Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub- Query – Joins – Aggregations – Group by and Having - RCFile Implementation - Hive User Defined Function - Serialization and Deserialization - Hive Analytic Functions

UNIT V

INTRODUCTION TO PIG & JASPERREPORTS

Pig: Introduction - Anatomy – Features – Philosophy - Use Case for Pig - Pig Latin Overview - Pig Primitive Data Types - Running Pig - Execution Modes of Pig – HDFS Commands - Relational Operators – Eval Function - Complex Data Types - Piggy Bank - User-Defined

Functions – Parameter Substitution - Diagnostic Operator - Word Count Example using Pig - Pig at Yahoo! – Pig Versus Hive - JasperReport using Jaspersoft..

Reference Book:

6. Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman, “Big data for dummies”, John Wiley & Sons, Inc.(2013)
7. Tom White, “Hadoop The Definitive Guide”, O’Reilly Publications, Fourth Edition, 2015
8. Dirk Deroos, Paul C.Zikopoulos, Roman B.Melnky, Bruce Brown, Rafael Coss, “Hadoop For Dummies”, Wiley Publications,2014
9. Robert D.Schneider, “Hadoop For Dummies”, John Wiley & Sons, Inc.(2012)
10. Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill, 2012 Chuck Lam, “Hadoop In Action”, Dreamtech Publications,2010

Text Book:

1. Seema Acharya, SubhashiniChellappan, “Big Data and Analytics”, Wiley Publications, First Edition,2015

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3 -/-/- 3

Professional Elective-IV
(R18A0530) Parallel and Distributed Computing

Course Objective: To learn the advanced concepts of Parallel and Distributed Computingand its implementation for assessment of understanding the course by the students

UNIT-I

Introduction: Scope , issues, applications and challenges of Parallel and Distributed Computing

Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor Architectures, Dichotomy of Parallel Computing Platforms, Physical Organization, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks, GPU, co-processing.

UNIT-II

Principles of Parallel Algorithm Design: Decomposition Techniques,Characteristics of Tasks and Interactions,Mapping Techniques for Load Balancing.

CUDA programming model: Overview of CUDA, Isolating data to be used by parallelized code, API function to allocate memory on parallel computing device, to transfer data, Concepts of Threads, Blocks, Grids, Developing a kernel function to be executed by individual threads, Execution of kernel function by parallel threads, transferring data back to host processor with API function.

UNIT-III

Analytical Modeling of Parallel Programs: Sources of Overhead in Parallel Programs,Performance Metrics for Parallel Systems,The Effect of Granularity on Performance,Scalability of Parallel Systems,Minimum Execution Time and Minimum Cost-Optimal Execution Time

UNIT-IV

Dense Matrix Algorithms: Matrix-VectorMultiplication,Matrix-Matrix Multiplication, Issues in Sorting on Parallel Computers, Bubble Sort and Variants, Quick Sort,Other Sorting Algorithms

UNIT-V

Graph Algorithms: Minimum Spanning Tree: Prim's Algorithm,Single-Source Shortest Paths:Dijkstra'sAlgorithm,All-Pairs Shortest Paths,TransitiveClosure,ConnectedComponents,Algorithms for Sparse Graph

Search Algorithms for Discrete Optimization Problems: Sequential Search Algorithms,Parallel Depth-First Search,Parallel Best-First Search,Speedup Anomalies in Parallel Search Algorithms

Recommended Books:

1. A Grama, AGupra, G Karypis, V Kumar. Introduction to Parallel Computing (2nd ed.). Addison Wesley,2003.
2. C Lin, L Snyder. Principles of Parallel Programming. USA: Addison-Wesley Publishing Company,2008.
3. J Jeffers, J Reinders. Intel Xeon Phi Coprocessor High-Performance Programming.Morgan Kaufmann Publishing and Elsevier,2013.
4 T Mattson, B Sanders, B Massingill. Patterns for Parallel Programming. Addison-Wesley Professional,2004.

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IV Year B. Tech CSE -IISem **L T/P/D C**

3 -/-/- 3

Professional Elective-IV
(R18A0531) Internet of Things

Objectives:

To introduce the terminology, technology and its applications
To explain the concept of M2M (machine to machine) with necessary protocols
To introduce the Python Scripting Language which is used in many IoT devices
To elucidate the Raspberry PI platform, that is widely used in IoT applications
To explain the implementation of web based services on IoT devices

Unit I

Introduction to Internet of Things –Definition and Characteristics of IoT,
Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs
IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates
Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health andLifestyle

Unit II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT
Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

Unit III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling
Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

Unit V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs
Webserver – Web server for IoT, Cloud for IoT, Python web application framework
Designing a RESTful web API

Course Outcomes :

Upon completion of this course, students should be able to:

1. Explain the importance and usage ofIOT.
2. Describe the various IOT levels andprotocols.
3. Develop programs inPython.
4. Illustrate the functioning of IOTdevices.
5. Relate IOT to cloud computing and webapplications.

TEXT BOOK:

Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

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IV Year B. Tech CSE -IISem **L T/P/D C**

3 -/-/- 3

Professional Elective-IV

(R18A0532) Advanced Algorithms

OBJECTIVES:

- To review the basic algorithm design strategies and understand the advanced algorithm design, development, and analysis techniques, various aspects of advanced algorithms andClassification.
- Study and analysis of parallel, probabilistic and randomizedalgorithms.

UNIT-I

Design Paradigms

Overview:- Overview of algorithm design paradigms- Divide and Conquer, Greedy and Dynamic Programming strategies. Basic search and traversal techniques for graphs, Backtracking, Branch and Bound.

UNIT-II

Max Flow Problem

String Matching:- Introduction to string-matching problem, Naïve algorithm, Rabin Karp, Knuth Morris Pratt, Boyer- Moore algorithms and complexity analysis.

UNIT-III

Theory of NP- Hard and NP-Complete Problems

Introduction:-P, NP and NP-Complete complexity class problems and examples; A few NP-Completeness proofs; other complexity classes.

Approximation Algorithms: Introduction, Combinatorial Optimization, approximation factor, PTAS, FPTAS, Approximation algorithms for vertex cover, set cover, TSP, knapsack, bin packing, subset-sum problem etc. Analysis of the expected time complexity of the algorithms.

UNIT-IV

Parallel Algorithms

Introduction, Models, Speedup and efficiency. Some basic techniques. Examples from graph theory, sorting, Parallel sorting networks. Parallel algorithms and their parallel time and processors complexity.

UNIT-V

Probabilistic Algorithms & Randomized Algorithms

Numerical probabilistic algorithms, Las Vegas and Monte Carlo algorithms, Game-theoretic techniques, Applications on graph problems

TEXT BOOKS:

1. "Introduction to Algorithms", Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, PHIPublication.
2. Approximation Algorithms: VijayV.Vazirani
3. Randomized Algorithms: R. Motwani andP.Raghavan
4. "Data Structures and Algorithms in C++", M.T. Goodrich, R. Tamassia and D.Mount, Wiley India.

REFERENCES:

1. Algorithmics: The spirit ofcomputing-D.Harel
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, SanguthevarRajasekaran, Second Edition, GalgotiaPublication
3. Data structures with C++, J. Hubbard, Schaum'soutlines,TMH.
4. Data structures and Algorithm Analysis in C++, 3rd edition, M. A. Weiss,Pearson.
5. Classic Data Structures, D. Samanta, 2nd edition,PHI.
6. Fundamentals of Algorithmics :G.BrassardandP.Bratley

OUTCOMES : By the end of the semester student should be able to

- To analyze the fundamental algorithm designstrategies.
- Understand the advanced algorithm design, development, and analysestechniques,
- Demonstrate various aspects of advanced algorithms andclassifythem.
- Design and analyze of parallel, probabilistic and randomizedalgorithms.

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IV Year B. Tech CSE -IISem **L T/P/D C**

3 -/-/- 3

Professional Elective-V
(R18A0533) Soft Computing

Objectives:

- To give the students an overall knowledge of soft computing theories andfundamentals.
- To give an understanding on the fundamentals of non-traditional technologies and approaches to solving hard real-world problems. Fundamentals of artificial neural networks, fuzzy sets and fuzzy logic and genetic algorithms. Use of ANN, Fuzzy sets to solve hard real-world problems. An overview of Genetic algorithms and machine learning techniques to solving hard real-worldproblems.

UNIT I

Evolution of Computing - Soft Computing Constituents - From Conventional AI to Computational Intelligence, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation - Using Predicate Logic andRules.

UNIT II

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network, Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT III

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks - Introduction to variousnetworks.

UNIT IV

Introduction to Classical Sets (crisp Sets) and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT V

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making.

Fuzzy Logic Control Systems, Genetic Algorithm- Introduction and basic operators and terminology, Applications: Optimization of TSP, Internet Search Technique.

TEXT BOOKS:

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India,2007.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva, Pearson Edition,2004.

REFERECE BOOKS:

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modeling of the Human BrainAmitKonar, CRC press, Taylor and FrancisGroup.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991,rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, PearsonEducation.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.
5. Artificial Intelligence and Intelligent Systems, N.P.Padhy, Oxford Univ.Press

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IV Year B. Tech CSE -IISem **L T/P/D C**

3 -/-/- 3

Professional Elective-V
(R18A0534) Block Chain Technology

Course Objectives

- To enable the student to understand and appreciate, the importance of fundamentals of blockchain technology and application of cryptography inblockchain.
- To gain the awareness about the concepts of various implementations of blockchain technology such as bitcoin, Ethereum, andHyperledger

UNIT - I

Introduction to Blockchain Technology – Distributed systems – The history of blockchain – Introduction to blockchain – CAP theorem and blockchain – Benefits and limitations of blockchain – Decentralization using blockchain - Methods of decentralization – Routes to decentralization

UNIT-II

Cryptography in Blockchain: Introduction – cryptographic primitives – Assymetric cryptography – public and private keys -line interface – Bitcoin improvement proposals (BIPs) – Consensus Algorithms.

UNIT – III

BitCoin- Introduction – Transactions – Structure - Transactions types – The structure of a block– The genesis block – The bitcoin network– Wallets and its types– Bitcoin payments– Bitcoin investment and buying and selling bitcoins – Bitcoin installation – Bitcoin programming and the command-line interface – Bitcoin improvement proposals (BIPs).

UNIT-IV

Ethereum - Ethereum blockchain- Elements of the Ethereum blockchain– Precompiled contracts – Accounts and its types – Block header- Ether – Messages – Mining - Clients and wallets – Trading and investment – The yellow paper - The Ethereum network - Applications developed on Ethereum - Scalability and securityissues.

UNIT-V

Smart Contract and Hyperledger – – History of Smart Contract – Ricardian contracts - The DAO. Hyperledger projects - Hyperledger as a protocol – Fabric - Hyperledger Fabric - Sawtooth lake – Corda Architecture.

TEXT BOOKS:

1. I. Bashir, *Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition*, 2nd Revised edition edition. Birmingham: Packt Publishing,2018.

REFERENCE BOOKS:

1. A. M. Antonopoulos, Mastering bitcoin, First edition. Sebastopol CA: O'Reilly,2015.
2. Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, "An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends," in 2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp.557–564.

Course Outcomes:

- Students will be able to
- To understand the fundamentals of blockchaintechnology.
- Apply knowledge of implementations of Bitcoin, Ethereum and Hyperledger to develop solutions in the appropriatedomains.

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IV Year B. Tech CSE -IISem **L T/P/D C**

3 -/-/- 3

Professional Elective-V
(R18A0535)Image Processing

Course Objectives:

- To comprehend the relation between human visual system and machine perception and processing of digital images.
- To provide a detailed approach towards image processing applications like enhancement, segmentation, andcompression.

Course Outcomes:

- Exploration of the limitations of the computational methods on digitalimages.
- Expected to implement the spatial and frequency domain image transforms on enhancement and restoration ofimages.
- Elaborate understanding on image enhancementtechniques.
- Expected to define the need for compression and evaluate the basic compressionalgorithms.

UNIT – I: Digital Image Fundamentals & Image Transforms:Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, HotellingTransform.

UNIT – II: Image Enhancement (Spatial Domain):Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering. Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in FrequencyDomain.

UNIT – III: Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT – IV: Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation. Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT – V: Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000Standards.

TEXT BOOKS:

- Digital Image Processing – Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson,2008
- Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- MC GRAW HILL EDUCATION, 2010.

REFERENCE BOOKS:

- Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools – ScotteUmbaugh, 2nd Ed, CRC Press,2011
- Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, MC GRAW HILL EDUCATION,2010.
- Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle-Cengage Learning (Indian edition)2008.
- Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition



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(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

BACHELOR OF TECHNOLOGY
ELECTRONICS & COMMUNICATION ENGINEERING

Course Structure & Syllabus
(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ”Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- “Program” means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
COURSE STRUCTURE

I Year B. Tech – I Semester (I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0001	English	2	-	-	2	30	70
2	R18A0021	Mathematics – I	4	1	-	4	30	70
3	R18A0013	Applied Physics	3	-	-	3	30	70
4	R18A0302	Engineering Graphics	1	-	4	3	30	70
5	R18A0501	Programming for Problem Solving	3	-	-	3	30	70
6	R18A0082	Engineering/IT Workshop	-	-	4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-	-	3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-	-	3	1.5	30	70
		TOTAL	**13**	**1**	**14**	**20**	**240**	**560**

I Year B. Tech – II Semester (II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0002	Professional English	2	-	-	2	30	70
2	R18A0022	Mathematics – II	4	1	-	4	30	70
3	R18A0012	Engineering Chemistry	3	-	-	3	30	70
4	R18A0502	Object Oriented Programming	3	-	-	3	30	70
5	R18A0201	Basic Electrical Engineering	3	-	-	3	30	70
6	R18A0083	Engineering Physics/Chemistry Lab	-	-	4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-	-	3	1.5	30	70
8	R18A0281	Basic Electrical Engineering Lab	-	-	3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2	-	-	0	100	-
		TOTAL	**17**	**1**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – I Semester (III Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0023	Mathematics-III	3	-	-	3	30	70
2	R18A0401	Electronic Devices & Circuits	3	-	-	3	30	70
3	R18A0402	Signals & Systems	3	-	-	3	30	70
4	R18A0403	Probability Theory & Stochastic Process	3	-	-	3	30	70
5	R18A0404	Switching Theory & Logic Design	3	-	-	3	30	70
6	R18A0261	Network Analysis & Transmission Lines	3	-	-	3	30	70
7	R18A0481	Electronic Devices & Circuits Lab	-	-	3	1.5	30	70
8	R18A0482	Basic Simulation Lab	-	-	3	1.5	30	70
9*	R18A0004	Foreign Language: French	2	-	-	-	100	-
		TOTAL	**20**	**-**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – II Semester (IV Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0209	Control Systems	3	-	-	3	30	70
2	R18A0405	Analog Circuits	3	-	-	3	30	70
3	R18A0406	Electromagnetic Fields & Waves	3	-	-	3	30	70
4	R18A0407	Analog Communications	3	-	-	3	30	70
5	R18A0061	Managerial Economics & Financial Analysis	3	-	-	3	30	70
6	OE I	OPEN ELECTIVE I	3	-	-	3	30	70
7	R18A0483	Analog Circuits Lab	-	-	3	1.5	30	70
8	R18A0484	Analog Communications Lab	-	-	3	1.5	30	70
9*	R18A0014	Environmental Science	2	-	-	-	100	-
		TOTAL	**20**	**-**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE I		
S.NO	SUBJECT CODE	SUBJECT
1	R18A0451	DIGITAL ELECTRONICS
2	R18A0551	DATA BASE SYSTEMS
3	R18A0553	DATA STRUCTURES USING PYTHON
4	R18A0351	INTELLECTUAL PROPERTY RIGHTS
5	R18A0352	GREEN ENERGY SYSTEMS
6	R18A0555	DATA VISUALIZATION

III Year B. Tech – I Semester (V Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0408	Digital Communications	3	-	-	3	30	70
2	R18A0409	LDIC	3	-	-	3	30	70
3	R18A0410	Antennas & Wave Propagation	3	-	-	3	30	70
4	R18A0411	Cellular & Mobile Communications	3	-	-	3	30	70
5	R18A0572 R18A0413 R18A0212	1. Computer Organization & OperatingSystems 2. Television Engineering 3. Digital Control Systems	3	-	-	3	30	70
6	OE II	OPEN ELECTIVE II	3	-	-	3	30	70
7	R18A0485	Digital Communications Lab	-	-	3	1.5	30	70
8	R18A0486	LDIC Lab	-	-	3	1.5	30	70
9*	R18A0521	Cyber Security	2	-	-	-	100	-
		TOTAL	**20**	**-**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE II		
S.NO	SUBJECT CODE	SUBJECT
1	R18A1251	MANAGEMENT INFORMATION SYSTEMS
2	R18A0552	INTRODUCTION TO JAVA PROGRAMMING
3	R18A1252	SOFTWARE PROJECT MANAGEMENT
4	R18A0353	ENTERPRISE RESOURCE PLANNING
5	R18A0354	NANO TECHNOLOGY



III Year B. Tech – II Semester (VI Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0414	Digital Signal Processing	3	-	-	3	30	70
2	R18A0415	Microprocessors & Microcontrollers	3	-	-	3	30	70
3	R18A1205	Artificial Intelligence	3	-	-	3	30	70
4	R18A0412 R18A0416 R18A0513	1. Instrumentation Engineering 2. Fiber Optical Communications 3. Computer Networks	3	-	-	3	30	70
5	OEIII	OPEN ELECTIVE III	3	-	-	3	30	70
6	R18A0487	Microprocessors & Microcontrollers Lab	-	-	3	1.5	30	70
7	R18A0488	Digital Signal Processing Lab	-	-	3	1.5	30	70
8	R18A0491	Mini Project	-	-	6	3	30	70
9*	R18A0007	Indian Constitution	2	-	-	-	100	-
		TOTAL	**17**	**-**	**12**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE III		
S.NO	SUBJECT CODE	SUBJECT
1	R18A0452	ROBOTICS & AUTOMATION
2	R18A0453	INTERNET OF THINGS & ITS APPLICATIONS
3	R18A0554	OPERATING SYSTEM CONCEPTS
4	R18A1253	SOFTWARE TESTING TECHNIQUES
5	R18A0355	TOTAL QUALITY MANAGEMENT
6	R18A0251	ELECTRICAL SYSTEMS & APPLICATIONS



IV Year B. Tech – I Semester (VII Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0418	VLSI Design	3	-	-	3	30	70
2	R18A0419	Radar Systems	3	-	-	3	30	70
3	R18A0420	Microwave Engineering	3	-	-	3	30	70
4	R18A0421	Embedded System Design	3	-	-	3	30	70
5	R18A0422 R18A0423 R18A0424	1. Digital Image Processing 2. Speech and Audio Processing 3. Multimedia & Signal Coding	3	-	-	3	30	70
6	R18A0489	eCAD & VLSI Lab	-	-	3	1.5	30	70
7	R18A0490	EM & MW Lab	-	-	3	1.5	30	70
8	R18A0492	Project-I	-	-	6	3	30	70
		TOTAL	**15**	**-**	**12**	**21**	**240**	**560**

IV Year B. Tech – II Semester (VIII Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0425	Wireless Communications & Networking	3	-	-	3	30	70
2	R18A0426 R18A0427 R18A0428	1. Detection and Estimation 2. Digital Signal Processors & Architectures 3. RF Circuit Design	3	-	-	3	30	70
3	R18A0429 R18A0430 R18A1261	1. Satellite Communications 2. Spread Spectrum Communications 3. Network Security & Cryptography	3	-	-	3	30	70
4	R18A0493	Project-II	-	-	12	6	60	140
		TOTAL	**09**	**-**	**12**	**15**	**150**	**350**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM –ECE **L T/P/D C**

2 - / - / - 2

(R18A0001) ENGLISH

OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing to ensure error-free writing.
4. To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
5. To expose students to various techniques of reading skills which hone their comprehensive skills.

UNIT –I

Chapter entitled "***The Road Not Taken****" by* Robert Frost
Grammar –Tenses and Punctuation (Sequences of Tenses)
Vocabulary –Word Formation – Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading – Techniques for effective reading-Reading Exercise –Type 1

UNIT – II

Chapter entitled "***Abraham Lincoln's Letter to His Son's Teacher***"
Grammar – Voices, Transitive and Intransitive Verbs
Vocabulary – Synonyms, Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Skimming, scanning- Reading Exercise –Type 2

UNIT – III

Chapter entitled "***War***" by L. Pirandello
Grammar –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Comprehension- Reading Exercise – Type 3

UNIT – IV

Chapter entitled "***J K Rowling's Harvard Speech***"
Grammar – Articles, Misplaced Modifiers
Vocabulary – One-Word Substitutes
Writing – Précis Writing
Reading – Intensive and Extensive reading – Reading Exercise – Type 4

UNIT –V

Sentence Structures (phrases and clauses)

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading – Identifying Errors – Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. Write formal or informal letters and applications for different purposes.
2. Select and extract relevant information through skimming and scanning.
3. Utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
4. Draft concise emails following professional email etiquette.
5. Enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM –ECE **L T/P/D C**

4 1/-/- 4

(R18A0021) MATHEMATICS –I

OBJECTIVES:

To learn

1. The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the eigen vectors of a given matrix.
2. Finding maxima and minima of functions of several variables.
3. Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)
4. How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
5. Solving differential equations using Laplace Transforms.

UNIT I:

Matrices

Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix – echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:

Functions of Several Variables

Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for two variables.

UNIT III:

Ordinary Differential Equations

First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations – Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV:

Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V:

Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t", Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2. Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .
3. Engineering Mathematics by N.P Bali and Manish Goyal.

OUTCOMES:

After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first and higher order differential equations.
4. Solve first order linear and non-linear partial differential equations.
5. Solve differential equations with initial conditions using Laplace Transform.

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B.TECH – I YEAR – I SEM – ECE

L	T/P/D	C
3	-/-/-	3

(R18A0011) APPLIED PHYSICS

OBJECTIVES:

1. To understand dual nature of the matter and behavior of a particle quantum mechanically.
2. To understand band structure of the solids and classification of materials.
3. To be able to distinguish pure, impure semiconductors and characteristics of PN junction diode.
4. To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
5. To be able to distinguish ordinary light with a laser light and realize the transfer of light through optical fibers.

UNIT – I

QUANTUM MECHANICS

Wave nature of particles, deBroglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – II

ELECTRONIC MATERIALS

Free electron theory, Fermi level, Density of states, Periodic potential-Bloch's theorem, Kronig – Penny modal, E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials on the basis of energy bands: Metals, semi conductors and insulators.

UNIT – III

SEMICONDUCTOR PHYSICS

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semi conductors, Carrier concentration in intrinsic and extrinsic semi conductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices – LED, Solar cell.

UNIT-IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT – V:

LASERS & FIBER OPTICS

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, types of pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers – Mode and Propagation through step and graded index fibers, Attenuation, Optical Fiber in Communication System, Applications of optical fibers.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

OUTCOMES:

After completion of studying Applied Physics the student is able to,

1. *Know the basic principles of quantum mechanics and the importance of behavior of a particle.*
2. *Realize the importance of band structure of solids and their applications in various electronic devices.*
3. *Learn concentration estimation of charge carriers in semiconductors and working principles of PN diode.*
4. *Learn dielectric, magnetic properties of the materials and apply them in material technology.*
5. *Learn the principles and production of LASER beams and transfer of information by optical fiber communication systems.*

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- ECE

L	T/P/D	C
1	-/4/-	3

(R18A0301) ENGINEERING GRAPHICS

Course Objectives:

1. Learn to sketch and take field dimensions.
2. Learn to take data and transform it into graphic drawings.
3. Learn basic engineering drawing formats

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids.

UNIT – V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

Course Outcomes:

1. Student's ability to convert sketches to engineered drawings will increase.
2. Students will be able to draw orthographic projections and sections.
3. Student's ability to perform basic sketching techniques willimprove.

TEXT BOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
   1) Engineering Drawing, N.D. Bhatt
   3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- ECE

L	T/P/D	C
3	-/-/-	3

(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

OBJECTIVES

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C tosolve problems.

UNIT - I

Introduction to Computing – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

Statements-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

Functions-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

Arrays- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

Strings- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

Pointers- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

Structures- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPBPublications.

OUTCOMES:

1. Demonstrate the basic knowledge of computer hardware and software.
2. To formulate simple algorithms for arithmetic and logical problems.
3. To translate the algorithms to programs (in C language).
4. To test and execute the programs and correct syntax and logical errors.
5. Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- ECE

L	T/P/D	C
-	-/-/ 4	2

(R18A0082) ENGINEERING WORKSHOP/ IT WORKSHOP

OBJECTIVES:

1. Student able to learn about different tools used in the lab
2. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student able to learn about different Carpentry and Fitting tools

2) TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

3) TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual – P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

OUTCOMES:

1. Students can understand different machine shop operations
2. Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student learned about metal cutting processes

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I YEAR- I SEM-ECE **L T/P/D C**

- -/ 4 /- 2

(R18A0082) IT WORKSHOP LAB

OBJECTIVES:

1. The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point
2. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.
3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.
4. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.
5. HTML introduction for creating static web pages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler – Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.

Header and Footer

Bullets and Numbering

Drawing Toolbar: Auto shapes, Textboxes, etc

Design Template

Introduction to custom animation.

b) Create a presentation to conduct a creativity session using the following tools:

1. Slide transition
2. Master slide view
3. Insert picture – clipart, image
4. Action button
5. Drawing tool bar – lines, arrows
6. Hyperlink
7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

TEXT BOOKS:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage's using HTML.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B. TECH- I YEAR- I SEM-ECE **L T/P/D C**

- -/3/- 1.5

(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

OBJECTIVES:

1. Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, andStructures.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.
6. Programming using gcc compiler in Linux.

Week 1:

a) Write a C program to find sum and average of three numbers.
b) Write a C program to find the sum of individual digits of a given positive integer.

Week 2:

a) Write a C program to generate the first n terms of the Fibonacci sequence.
b) Write a C program to generate prime numbers from 1 to n.
c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:

a) Write a C program to check whether given number is perfect number or not.
b) Write a C program to check whether given number is strong number or not.

Week 4:

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to perform arithmetic operations using switch statement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursive function.
b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.
b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to Sort the Array in an Ascending Order
c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.

b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.

b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or – 1 if S doesn't contain T.

Week 12:

a) Write C program to count the number of lines, words and characters in a given text.

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V.Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

OUTCOMES:

1. Acquire knowledge about the basic concept of writing a program.
2. Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3. Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
4. Understand the Role of Functions involving the idea of modularity.
5. Understand the Concept of Array and pointers dealing with memory management.
6. Learn Structures and unions through which derived data types can be formed.

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(R18A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

OBJECTIVES:

1. To expose students to a variety of self-instructional, learner-friendly modes of language learning
2. To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
3. To enable students to overcome public speaking anxiety and equip them to become employable.
4. To familiarize students with formal telephonic expressions by means of appropriate tone.
5. To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking Activity – JAM Session- Greetings – Taking Leave – Introducing Oneself and Others.

UNIT –II

CALL Lab: Syllabification – Stress &Intonation- Rules of Stress Markings and Intonation
ICS Lab: Situational Dialogues/Role Plays – Making Requests and Seeking Permissions.

UNIT –III

CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)
ICS Lab: Communication at Work Place – Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IV Processor
   a) Speed –2.8 GHZ
   b) RAM –512 MB Minimum
   c) HardDisk –80 GB
ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

OUTCOMES:

Students will be able to:

1. understand the importance of learning phonetics.
2. learn how to pronounce words using phonetic transcription.
3. know the importance of speaking English with rhythm and intonation.
4. effectively participate in JAM session.
5. use polite expressions in all formal situations.
6. effectively communicate through telephone.

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(R18A0002) PROFESSIONAL ENGLISH

OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I

Listening - Bill Gate's TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects and Persons
Grammar - Finite and Non-finite verbs
Vocabulary - Business Vocabulary
Writing - Paragraph Writing

Unit –II

Listening - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

Unit –III

Listening - Sample Interviews (videos)
Speaking - Mock Interviews
Grammar - Direct and Indirect Speech
Vocabulary - Standard Abbreviations (Mini Project)
Writing - Job applications I (Cover Letter)

Unit – IV

Listening - Telephonic Interviews
Speaking - Telephonic Expressions
Grammar - Auxiliary verbs
Vocabulary - Word Analogy-I
Writing - Job Application II (Resume)

Unit – V

Listening - Tanmay Bhakshi's ITU interview
Speaking - Professional Etiquette
Grammar - Common Errors
Vocabulary - Word Analogy-II
Writing - Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. draft coherent and unified paragraphs with adequate supporting details.
2. demonstrate problem solving skills, decision-making skills, analytical skills.
3. comprehend and apply the pre-interview preparation techniques for successful interview.
4. achieve expertise in writing resume and cover letter formats.
5. understand the steps of writing 'Reports and Abstract'.

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(R18A0022) MATHEMATICS-II

OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of anequation.
2. To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
3. Evaluation of improper integrals using Beta and Gamma functions.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I:

Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences – Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae. Interpolation with unevenly spaced points – Lagrange's Interpolation.

UNIT – II:

Numerical Methods

Numerical integration: Generalized quadrature – Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

Curve fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III:

Beta and Gamma functions

Introduction of improper integrals- Beta and Gamma functions – Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV:

Double and Triple Integrals

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V:

Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral – Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

OUTCOMES:

After learning the contents of this paper the student must be able to

1. Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
2. Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3. Find a numerical solution for a given differential equation.
4. Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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(R18A0013) ENGINEERING CHEMISTRY

OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
2. To analyze microscopic chemistry in terms of atomic and molecular orbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
5. To analyze different types of fuels and their applications in various engineering fields.

UNIT-I:

Electrochemistry and Corrosion

Electrochemistry: Introduction to electrochemistry; Electrochemical cells – electrode potentials, construction and working of a galvanic cell, EMF and its applications – potentiometric titration; Nernst equation and its applications; Batteries – classification of batteries, primary cell – lithium cells and secondary cells – lead acid battery and lithium ion battery; Fuel cells – H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods – cathodic protection – sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings – hotdipping – galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) – advantages and applications of electroplating/electroless plating.

UNIT –II:

Atomic and Molecular Structure

Atomic and molecular orbitals; Postulates of molecular orbital theory – Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

UNIT –III:

Water and its Treatment

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

UNIT-IV:

Organic Reactions

Introduction to Organic Reactions – Types of reactions; Substitution – Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition – electrophilic and nucleophilic addition reactions; addition of HBr to propene – Markownikoff and Anti-Markownikoff's additions; Elimination reactions – dehydrohalogenation of alkyl halides; Oxidation reactions – oxidation of alcohols using $KmnO_4$ and chromic acid; Reduction reactions – reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

UNIT-V:

Energy Sources

Fuels- Definition, classification (solid, liquid & gaseous fuels) – characteristics of a good fuel; Coal – analysis of coal – proximate and ultimate analysis and their significance; Petroleum - refining, knocking – octane and cetane number, cracking – fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16th Edition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited , 2018.

REFERENCE BOOKS:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

OUTCOMES:

The basic concepts included in this course will help the student to:

1. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
2. Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
3. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
4. Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
5. Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

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(R18A0502)OBJECT ORIENTED PROGRAMMING

OBJECTIVES:

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming and procedural programming.
- To design applications using object oriented features.
- To teach the student to implement object oriented concepts.

Unit - I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures &Loops.

Functions: Introduction to functions, Inline functions, Command Line arguments.

Unit - II

Classes and Objects:

Introduction of Classes: Class Definition, Defining a Members, Objects, Access Control, Class Scope, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Friend Functions.

Constructors and Destructors:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Destructors.

Unit - III

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Pointers: Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes.

Unit - IV

Virtual Functions and Polymorphism:

Polymorphism, Compile time polymorphism: Overloading- Function Overloading, Operator overloading, Run time polymorphism, Virtual Functions.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism.

Unit -V

Templates:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Standard Template Library Classes: STL Container classes- Array class, Vector,stack,queue, STL Algorithm classes- Sort, reverse, max, min.

Application Development using C++

Text Books:

1. Object Oriented Programming with C++ by Balaguruswamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt,TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.

The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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(R18A0201) BASIC ELECTRICAL ENGINEERING

OBJECTIVES:

1. This course introduces the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
2. The emphasis is laid on the basic elements in electrical circuits.
3. Analysis of Circuits Which Includes Network Analysis & Network Theorems.
4. Analysis of Single Phase AC Circuits, Magnetic Circuits and Basic Treatment of Single Phase Transformers and DC Machines is introduced.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,

Network Theorems**:** Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem and Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form, Complex and Polar forms of representation. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Phase and Phase difference, Concept of Power Factor, Real, Reactive and Complex power, Illustrative Problems.

UNIT –IV:

Electrical Machines (elementary treatment only):

Single phase transformers: principle of operation, constructional features and emf equation. DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations:

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

TEXT BOOKS:

1. Engineering Circuit Analysis – William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits – A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis – N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

OUTCOMES:

At the end of this course the student would get

1. A thorough knowledge of the basic RLC circuit elements
2. Understanding of the basic concepts of networks and circuits with RLC
3. Concepts of single phase AC circuits
4. Network theorems and their application to solve problems in Network analysis
5. Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

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(R18A0083) ENGINEERING PHYSICS/ CHEMISTRY LAB

(Any 8 experiments compulsory)

OBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics and electronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physics lab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser –Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. C-R circuit – Time Constant of RC circuit
8. Characteristics of LED.
9. Characteristics of a Solar cell.
10. Evaluation of numerical aperture of optical fiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**,V.G.S.publications.
2. Engineering physics practical lab manual – **MRCET.**

OUTCOMES

1. The students learn the concepts of error, analyze and try to formulate new solutions to the problems related to engineering physics.
2. B.Tech students basically learning the mechanical behavior of the wire and practically determining the elastic constant. Transverse and longitudinal waves are practically studied. Variation of the magnetic fields along with terrestrial magnetism is practically studied.
3. Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determined experimentally.
4. Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practically studied.
5. The students learn experimental skills to design new experiments suitable for requirements in different fields(industrial, medical, scientific fields etc.)

(R18A0083) ENGINEERING CHEMISTRY LAB

(Any Eight Experiment Compulsory)

OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

1. Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
2. Practical implementation of fundamental concepts.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

List of Experiments

Titrimetry:

1. *Estimation of hardness of water by EDTA method.*

Instrumental Methods:

Colorimetry:

2. *Determination of Ferrous iron in cement by Colorimetric method*
3. *Estimation of Copper by Colorimetric method.*

Conductometry:

4. *Estimation of HCl by Conductometric titrations.*
5. *Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.*

Potentiometry:

6. *Estimation of HCl by Potentiometric titrations.*
7. *Estimation of Fe^{2+} by Potentiometry using $KmnO_4$.*

Preparation:

8. *Preparation of Aspirin.*

Physical properties:

9. *Determination of Viscosity of sample oil by Redwood Viscometer.*
10. *Determination of Surface Tension of a given liquid by Stalagmometer.*

TEXT BOOK:

1. *Inorganic quantitative analysis, Vogel*
2. *A text book on experiments and calculation in Engineering Chemistry by S.S. Dara*

REFERENCE BOOKS:

1. *Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.*
2. *Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.*

OUTCOMES:

At the end of the course students will be able to

1. Estimate the total hardness present in a sample of water.
2. Select lubricants for various purposes and determine the surface tension of a given liquid.
3. Prepare synthetic drug molecule.
4. Determine the strength of an acid by conductometric and potentiometric methods.
5. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

OBJECTIVES:

1. To strengthen problem solving ability by using the characteristics of an object-oriented approach.
2. To design applications using object oriented features
3. To handle Exceptions in programs.
4. To teach the student to implement object oriented concepts

Week 1:

Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positive integer.

b) Write a C++ program to generate the first n terms of the sequence.

Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n isa value supplied by the user.

b) Write a C++ program to find both the largest and smallest number in a list ofintegers.

Week 4:

a) Write a C++ program to sort a list of numbers in ascending order.

b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation

Week 5

a) Write a program Illustrating Class Declarations, Definition, and AccessingClass Members.

b) Program to illustrate default constructor, parameterized constructor and copy constructors

c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.
b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

a) Reading a matrix. B) Addition of matrices. C) Printing a matrix.
d) Subtraction of matrices. E) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:
a)Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

a) Write a Template Based Program to Sort the Given List of Elements.
b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it anda Catch Block to Handle it Properly.
b) Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

TEXT BOOKS:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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(R18A0281) BASIC ELECTRICAL ENGINEERING LAB

OBJECTIVES:

To Design Electrical Systems.

1. To Analyze A Given Network By Applying Various Network Theorems.
2. To Expose The Students To The Operation Of DC Generator
3. To Expose The Students To The Operation Of DC Motor and Transformer.
4. To Examine The Self Excitation In DC Generators.

CYCLE –I

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Superposition theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

CYCLE-II

7. Magnetization characteristics of DC shunt generator.
8. Swinburne's test on DC shunt machine.
9. Brake test on DC shunt motor.
10. OC & SC tests on single phase transformer.
11. Load test on single phase transformer.

NOTE: Any 10 of Above Experiments Are To Be Conducted

OUTCOMES:

After successfully studying this course, students will:

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines
3. Acknowledge the principles of operation and the main features of electric machines and their applications.
4. Acquire skills in using electrical measuring devices.

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(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVE

(Mandatory Course)

OBJECTIVES:

This introductory course input is intended:

1. to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. to facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. to highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human ndiana and mutually enriching interaction with Nature.

UNIT – I:

Course Introduction – Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration – what is it? – its content and process; 'Natural Acceptance' and Experiential Validation – as the mechanism for self exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities – the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT – II:

Understanding Harmony in the Human Being – Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' – Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT – III:

Understanding Harmony in the Family and Society – Harmony in Human – Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human – human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society – Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) – from family to world family!

UNIT – IV:

Understanding Harmony in the nature and Existence – Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature – recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT – V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.

6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life.

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(R18A0023) MATHEMATICS – III

COURSE OBJECTIVES:

To learn

1. The evaluation of improper integrals, Beta and Gamma functions.
2. Series solutions for Legendre and Bessel differential equations, analyzing the properties of Legendre and Bessel polynomials.
3. Differentiation and Integration of complex valued functions. Evaluation of integrals using Cahchy's integral formula.
4. Taylor's series, Maclaurin's series and Laurent's series expansions of complex functions Evaluation of integrals using residue theorem.
5. Transform a given function from z – plane to w – plane. Identify the transformations like translation, magnification, rotation and reflection and inversion , Properties of bilinear transformations

UNIT – I

Improper Integration: Beta and Gamma functions – Relation between them, their properties – Evaluation of Improper Integrals using Beta and Gamma functions.

UNIT – II

Special Functions: Legendre's Differential equation, General solution of Legendre's equation, Legendre polynomials Properties: Rodrigue's formula – Recurrence relations, Generating function of Legendre's polynomials – Orthogonality. Bessel's Differential equation, Bessel functions properties: – Recurrence relations, Orthogonality, Generating function , Trigonometric expansions involving Bessel functions.

UNIT – III

Complex Functions –Differentiation and Integration: Complex functions and its representation on Argand plane, Concepts of limit Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

UNIT – IV

Power series expansions of complex functions and contour Integration: Radius ofconvergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty} f(x)dx$ (b) $\int_c f(cos\Theta, sin\Theta)d\Theta$

UNIT – V

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation; Magnification and rotation; inversion and reflection,Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given .

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Engineering Mathematics-3 By T.K.V.Iyengar andB.Krishna Gandhi Etc

REFERENCES:

1. Complex Variables Principles And Problem Sessions By A.K.Kapoor, World Scientific Publishers
2. A Text Book Of Engineering Mathematics By N P Bali, Manesh Goyal
3. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Identify Bessel equation and Legendre equation and solve them under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Bessel and Legendre polynomials.
2. Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem,
3. Find the Taylor's and Laurent series expansion of complex functions
4. The conformal transformations of complex functions can be dealt with ease.

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(R18A0401) ELECTRONIC DEVICES AND CIRCUITS

COURSE OBJECTIVES:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

1. To familiarize the student with the principal of operation, analysis and design of junction diode. BJT and FET transistors and amplifier circuits.
2. To understand diode as a rectifier.
3. To study basic principal of filter of circuits and various types

UNIT-I

P-N Junction diode: Diode equation, Volt-Ampere characteristics, Temperature dependence of V-I characteristic, Ideal versus practical –resistance levels (static and dynamic), Transition and diffusion capacitances, Diode equivalent circuits, Breakdown mechanisms, Diode as – switch, clipper, clamper

RECTIFIERS: P-N Junction as a rectifier, Half wave rectifier, Full wave rectifier, Bridge rectifier, Capacitor filter

UNIT-II

BIPOLAR JUNCTION TRANSISTOR: Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. BJT Hybrid Model: h-parameter representation of a transistor, Operating point, the D.C and A.C Load lines, Fixed bias, Collector to base bias, Self-bias techniques for stabilization, Stabilization factors, (s, s^{I}, s^{II}), Bias Compensation using diode and transistor , (Compensation against variation in V_{BE}, I_{CO}).

UNIT-III

TRANSISTOR AMPLIFIERS: Thermal runaway and Thermal stability**,** Conversion of h-parameters**,** Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_i, R_i , A_v,and R_o

UNIT-IV

FIELD EFFECT TRANSISTOR AND FET AMPLIFIER

JFET-Construction, principle of Operation, Volt –Ampere characteristics, Pinch- off voltage. Small signal model of JFET. FET as Voltage Variable Resistor, Comparison of BJT and FET. MOSFET-Construction, Principle of Operation and symbol, MOSFET characteristics in Enhancement and Depletion modes.

UNIT V:

FET Amplifiers: FET Biasing, Common source Amplifier, Common Drain Amplifier.

Special purpose Devices: Principal of operation and Characteristics- Zener diode, Tunnel Diode, Varactar Diode, photo diode, SCR And UJT

TEXT BOOKS:

1. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.
2. Electronic Devices and Circuits Theory, Boylsted, Prentice Hall Publications.
3. Electronic Devices and Circuits, S.Salivahanan,N.Suresh kumar, McGraw Hill.
4. Electronic Devices and Circuits,Balbir kumar ,shail b.jain, PHI Privated Limted, Delhi.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.S Publications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. Electronic Devices and Circuits,A.P Godse, U.A Bakshi , Technical Publications
4. Electronic Devices and Circuits K.S. Srinivasan Anurdha Agencies

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1. Understand and Analyse the different types of diodes, operation and its characteristics
2. Design and analyse the DC bias circuitry of BJT and FET
3. Design biasing circuits using diodes and transistors.
4. To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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(R18A0402) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

The main objectives of the course are:

1. Knowledge of time-domain representation and analysis concepts of basic elementary signals
2. Knowledge of Fourier Series for Continuous Time Signals
3. Knowledge of frequency-domain representation and analysis concepts F.T., L.T. & Z.T and Concepts of the sampling process.
4. Mathematical and computational skills needed to understand the principal of Linear System and Filter Characteristics of a System.
5. Mathematical and computational skills needed to understand the concepts of auto correlation and cross correlation and power Density Spectrum.

UNIT I:

INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Classification of Signals, Basic Operations on signals.

FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Properties of Fourier transforms.

SAMPLING: Sampling theorem **–** Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT III:

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics.

UNIT IV:

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between convolution and correlation.

UNIT V:

LAPLACE TRANSFORMS: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z- Transform, Properties of Z-transforms.

TEXT BOOKS:

1. "Signals & Systems", Special Edition – MRCET, McGraw Hill Publications, 2017
2. Signals, Systems & Communications – B.P. Lathi, BS Publications, 2003.
3. Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
4. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.

REFERENCE BOOKS:

1. Signals & Systems – Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Network Analysis – M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
4. Signals, Systems and Transforms – C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd Edition, 2004.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

1. Understand the basic elementary signals
2. Determine the Fourier Series for Continuous Time Signals
3. Analyze the signals using F.T, L.T & Z.T and study the properties of F.T., L.T. & Z.T.
4. Understand the principal of Linear System and Filter Characteristics of a System.
5. Understand the concepts of auto correlation and cross correlation and power Density Spectrum.

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(R18A0403) PROBABILITY THEORY AND STOCHASTIC PROCESS

OBJECTIVES:

1. To provide mathematical background and sufficient experience so that student can read, write and understand sentences in the language of probability theory.
2. To introduce students to the basic methodology of "probabilistic thinking" and apply it to problems.
3. To understand basic concepts of Probability theory and Random Variables, how to deal with multiple Random Variables.
4. To understand the difference between time averages statistical averages.
5. To teach students how to apply sums and integrals to compute probabilities, and expectations.

UNIT I:

Probability and Random Variable

Probability: Set theory, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events, Bernoulli's trials.

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable

UNIT II:

Distribution and density functions and Operations on One Random Variable

Distribution and density functions: Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Exponential Gaussian, Rayleigh and Conditional Distribution, Methods of defining Conditioning Event, Conditional Density function and its properties, problems.

Operation on One Random Variable: Expected value of a random variable, function of a random variable, moments about the origin, central moments, variance and skew, characteristic function, moment generating function, transformations of a random variable, monotonic transformations for a continuous random variable, non monotonic transformations of continuous random variable, transformations of Discrete random variable

UNIT III:

Multiple Random Variables and Operations on Multiple Random Variables

Multiple Random Variables: Vector Random Variables, Joint Distribution Function and Properties, Joint density Function and Properties, Marginal Distribution and density Functions, conditional Distribution and density Functions, Statistical Independence, Distribution and density functions of Sum of Two Random Variables and Sum of Several Random Variables, Central Limit Theorem – Unequal Distribution, Equal Distributions

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, and

Jointly Gaussian Random Variables: Two Random Variables case and N Random Variable case, Properties, Transformations of Multiple Random Variables

UNIT VI:

Stochastic Processes-Temporal Characteristics: The Stochastic process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Statistical Independence and concept of Stationarity: First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions and its properties, Gaussian Random Processes.

Linear system Response: Mean and Mean-squared value, Autocorrelation, Cross-Correlation Functions.

UNIT V:

Stochastic Processes-Spectral Characteristics: The Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum and Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Spectral characteristics of system response: power density spectrum of response, cross power spectral density of input and output of a linear system

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles –Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability and Random Processes-Scott Miller, Donald Childers,2Ed,Elsevier,2012

REFERENCE BOOKS:

1. Theory of probability and Stochastic Processes-Pradip Kumar Gosh, University Press
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis- George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4. Statistical Theory of Communication –S.P. Eugene Xavier, New Age Publications 2003
5. Probability, Random Variables and Stochastic Processes Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.

OUTCOMES:

Upon completion of the subject, students will be able to compute:

1. Simple probabilities using an appropriate sample space.
2. Simple probabilities and expectations from probability density functions (pdfs)
3. Likelihood ratio tests from pdfs for statistical engineering problems.
4. Least –square & maximum likelihood estimators for engineering problems.
5. Mean and covariance functions for simple random processes.

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(R18A0404) SWITCHING THEORY AND LOGIC DESIGN

COURSE OBJECTIVES:

This course provides in-depth knowledge of switching theory and the logic design techniques of digital circuits, which is the basis for design of any digital circuit. The course objectives are:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits
4. To design combinational logic circuits, sequential logic circuits.
5. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
6. To implement synchronous state machines using flip-flops.

UNIT –I:

Number System and Boolean Algebra And Switching Functions:

Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes, Hamming Code.

Boolean Algebra:

Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates. Multilevel NAND/NOR realizations.

UNIT –II:

Minimization and Design of Combinational Circuits:

K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Prime and Essential prime Implications, Quine Mc Cluskey Tabular Method, Combinational Design, Arithmetic Circuits, Comparator, decoder, Encoder, Multiplexers, DeMultiplexers, Code Converters.

UNIT –III:

Sequential Machines Fundamentals:

Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip-Flop, The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration.

UNIT –IV:

Sequential Circuit Design and Analysis:

Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops Counters – Design of Ripple Counter, Synchronous counter, Ring Counter, Registers, Shift Register**.**

UNIT –V:

Sequential Circuits:
Finite state machine- capabilities and limitations ,Mealy and Moore models, , minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.
Algorithmic State Machines:
Salient features of the ASM chart-Simple examples- Weighing machine and Binary multiplier.

TEXT BOOKS:
1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:
1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Switching Theory and Logic Design – Bhanu Bhaskara –Tata McGraw Hill Publication, 2012
4. Fundamentals of Logic Design- Charles H. Roth, Cengage Leanring, 5th, Edition, 2004.
5. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006. 6. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

COURSE OUTCOMES:
Upon completion of the course, student should possess the following skills:
1. Be able to manipulate numeric information in different forms
2. Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Be able to design and analyze small combinational circuits and to use standard combinational functions to build larger more complex circuits.
4. Be able to design and analyze small sequential circuits and to use standard sequential functions to build larger more complex circuits.

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(R18A0261) NETWORK ANALYSIS & TRANSMISSION LINES

COURSE OBJECTIVES:

This course introduces the basic concepts of transient analysis of the circuits, the basic two-port network parameters, design analysis of the filters and attenuators and their use in the circuit theory, analysis of the locus diagrams, resonance, magnetic circuits. The emphasis of this course is laid on the basic operation of DC machines which includes DC generators and DC motors.

UNIT – I:

Transient Analysis (First and Second Order Circuits): Introduction to transient response and steady state response, Transient response of series –RL, RC RLC Circuits for sinusoidal, square, ramp and pulse excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform method,

UNIT – II:

Two Port Networks: Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one of parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of two port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

UNIT-III:

Locus diagrams, Resonance and Magnetic Circuits: Locus diagrams – Series and Parallel RL, RC, RLC circuits with variation of various parameters – Resonance-Series and Parallel circuits, Concept of band width and quality factor.

Magnetic Circuits- Faraday's laws of electromagnetic induction, Concept of self and mutual inductance, Dot convention, Coefficient of coupling, Composite magnetic circuits, Analysis of series and parallel magnetic circuits.

UNIT – IV:

Transmission Lines – I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Illustrative Problems.

UNIT V:

Transmission Lines – II: SC and OC Lines, Input Impedance Relations, Reflection Coefficient, VSWR, λ/4, λ 2, λ /8 Lines – Impedance Transformations, Significance of Zmin and Zmax, Smith Chart – Configuration and Applications, Single Stub Matching, Illustrative Problems.

TEXT BOOKS:

1. Electrical Circuits – A. Chakrabarhty, Dhanipat Rai & Sons.
2. Network Analysis – N.C Jagan and C. Lakhminarayana, BS publications.
3. A Text book of Electrical Technology by B.L Theraja and A.K Theraja, S.Chand publications
4. Basic Concepts of Electrical Engineering – PS Subramanyam, BS Publications.
5. Transmission Lines and Networks – Umesh Sinha, Satya prakashan, 2001, (Tech. India

Publications), New Delhi.

REFERENCE BOOKS:

1. Engineering Circuits Analysis – William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition.
2. Basic Electrical Engineering – S.N. Singh PUI.
3. Electrical Circuits – David A. Bell, Oxford Printing Press.
4. Principles of Electrical Engineering by V.K Mehta, Rohit Mehta, S.Chand publications.
5. Electrical Circuit Analysis – K.S. Suresh Kumar, Pearson Education.

COURSE OUTCOMES:

After going through this course the student gets a thorough knowledge on Transient analysis of the circuits, filters, attenuators and the operation of DC machines with which he/she can able to apply the above conceptual things to real world problems and applications

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(R18A0481) ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   i. Multimeters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. P-N junction diode characteristics
2. Zener diode characteristics and Zener as voltage regulator
3. Half –Wave Rectifier with and without filter
4. Full – Wave Rectifier with and without filter
5. Input and output characteristics of transistor in CB configuration
6. Input and output characteristics of transistor in CE configuration
7. FET Characteristics
8. h-parameters of CE configuration
9. Frequency response of CE amplifier
10. Frequency response of CC amplifier
11. Frequency response of common source FET amplifier
12. UJT CHARACTERISITCS

PART C: Equipment required for Laboratories:

1. Regulated Power supplies (RPS)	0-30 V
2. CRO's	0-20 MHz
3. Function Generators	0-1 MHz
4. Multimeters	
5. Decade Resistance Boxes / Rheostats	
6. Decade Capacitance Boxes	
7. Ammeters (Analog or Digital)	0-20 Ma, 0-50Ma, 0-100Ma, 0-200Ma, 0-10 Ma
8. Voltmeters (Analog or Digital)	0-50V, 0-100V, 0-250V
9. Electronic Components	Resistors, Capacitors, BJT's, LCD's, SCR's, UJTs, FET's,LED's, MOSFET's, Diodes- Ge & Si type, Transistors – NPN, PNP type

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(R18A0482) BASIC SIMULATION LAB

Note:

1. All the experiments are to be simulated using MATLAB or equivalent software
2. Minimum of 15 experiments are to be completed

List of experiments:

1. Basic operations on matrices.
2. Generation on various signals and Sequences (periodic and aperiodic), such as unit impulse, unit step, square, sawtooth, triangular, sinusoidal, ramp, sinc.
3. Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal/sequence and real and imaginary part of signal.
5. Convolution between signals and sequences.
6. Auto correlation and cross correlation between signals and sequences.
7. Verification of linearity properties of a given continuous /discrete system.
8. Verification of time invariance properties of a given continuous discrete system.
9. Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its physical Realizability and stability properties.
10. Gibbs phenomenon.
11. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
12. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
13. Generation of Gaussian Noise (real and complex), computation of its mean, M.S. Value and its skew, kurtosis, and PSD, probability distribution function.
14. Sampling theorem verification.
15. Removal of noise by auto correlation/cross correlation.
16. Verification of Weiner-Khinchine relations.
17. Checking a random process for stationary in wide sense.

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MANDATORY COURSE – II

(R18A0004) FOREIGN LANGUAGE-FRENCH

INTRODUCTION:

In view of the growing importance of foreign languages as a tool for local communication in few countries French has been identified as one of the most required language after English. So the consequent emphasis on training students to acquire communicative competence in foreign language, the syllabus has been designed to develop linguistic and communicative competencies of engineering students. In the French classes, the focus is on the basic speaking skills.

COURSE OBJECTIVES:

1. To improve the basic speaking skills of the French language.
2. To hone the basic sentence constructions in day to day expressions for communication in their work place.

SYLLABUS

UNIT-I:

Pronunciation guidelines; Single vowels, Vowels and consonants combinations,; Numbers and Genders; articles verbs and their groups; present tense; adjectives from singular to plural

UNIT-II

Sentences Structures; Prepositions, affirmatives, Negative and, Interrogative Sentences, The Family, Conversation, Notes on Vocabulary, Grammar, Liaisons and mechanisms.

UNIT-III

D'où viens-tu (Where do you come from); Vocabulary, Conversation, Notes on Vocabulary, Liaisons Guidelines. Comparer (Comparing); Vocabulary, Conversation, Liaisons, Ordinal Number up to 100. Grammar.

UNIT-IV

Le temps (Time); Vocabulary, Grammar; Vocabulary related to – The Family, Vocabulary – Some more grammar.

UNIT-V

French Expressions and Idioms; Day-to-day Life, At Work, about Sports, Specia Events Other French Flavours; country of wine, ndiana and landscapes; - Québec and Accadie, , pass time in Suisse, people of france.

REFERENCE BOOKS:

1. Le Nouveau Sans Frontiere-1, Cle International | 2003 |
2. Cahier d' activit'es ov Le Nouveau Sans Frontiere-1 Cle International | 2003 |
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures By by Evelyne Charvier-Berman, Anne C. Cummings.

COURSE OUTCOMES:

1. The student will be in a position to speak in French, Which is the second most widely learned foreign language after English, and the ninth most widely spoken language in the world. French is also the only language, alongside English, that is taught in every country in the world.
2. The Student will get the ability to speak French is an advantage on the international job market.
3. Students with a good level of French are eligible for French government scholarships to enroll in postgraduate courses in France in any discipline and qualify for internationally recognized French degrees.

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3	-/-/-	3

(R18A0209) CONTROL SYSTEMS

OBJECTIVES

In this course it is aimed to

1. Introduce the principles and applications of control systems in everyday life.
2. The basic concepts of block diagram reduction, transfer function representation, time response and time domain analysis, solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT - I:

Introduction: Concept of control system, Classification of control systems - Open loop and closed loop control systems, Differences, Examples of control systems- Effects of feedback, Feedback Characteristics.

Transfer Function Representation: Block diagram algebra, Determining the Transfer function from Block Diagrams, Signal flow graphs(SFG) - Reduction using Mason's gain formula- Transfer function of SFG's.

UNIT - II:

Time Response Analysis: Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response, Steady state errors and error constants.PID controllers: Effects of proportional derivative, proportional integral systems on steady state error.

UNIT - III:

Stability Analysis in S-Domain: The concept of stability – Routh-Hurwitz's stability criterion – qualitative stability and conditional stability – Limitations of Routh-Hurwitz's stability.

Root Locus Technique: Concept of root locus - Construction of root locus.

UNIT - IV:

Frequency Response Analysis: Introduction, Frequency domain specifications, Bode plot diagrams-Determination of Phase margin and Gain margin, Stability analysis from Bode plots, Polar plots.

UNIT - V:

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, Derivation of state models from block diagrams, Diagonalization, Solving the time invariant state equations, State Transition Matrix and it's properties, Concepts of Controllability and observability.

TEXT BOOKS:

Control Systems Engineering - I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
Control Systems - A. Ananad Kumar, PHI.
Control Systems Engineering by A. Nagoor Kani, RBA Publications.

REFERENCE BOOKS:

Control Systems Theory and Applications - S. K. Bhattacharya, Pearson.
Control Systems Engineering - S. Palani, TMH.
Control Systems - N. K. Sinha, New Age International (P) Limited Publishers.
Control Systems by S.Hasan Saeed, KATSON BOOKS.

Solutions and Problems of Control Systems by A.K. Jairath, CBS Publishers.

OUTCOMES

After going through this course the student gets

1. A thorough knowledge on open loop and closed loop control systems, concept of feedback in control systems.
2. Transfer function representation through block diagram algebra and signal flow graphs.
3. Time response analysis of different ordered systems through their characteristic equation.
4. Time domain specifications, stability analysis of control systems in s-domain through R-H criteria.
5. Root locus techniques, frequency response analysis through Bode diagrams, Nyquist, Polar plots.
6. The basics of state space analysis, design of lag, lead compensators, with which he/she can able to apply the above conceptual things to real world electrical and electronics problems and applications.

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II Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
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(R18A0405) ANALOG CIRCUITS

COURSE OBJECTIVES:

The main objectives of the course are:

1. Study about Wave shaping concepts of both linear and non-linear circuits.
2. Study about the designing of multivibrators.
3. Study about Time Base Generator, understanding sampling gates and Logic Gates.
4 .Analysis of basic transistor amplifier circuits and their frequency response characteristics, feedback amplifiers, oscillators, large signal amplifiers

UNIT –I:

BJT Amplifiers-Frequency Response: Frequency response of an amplifier, Analysis at low and High Frequencies, Hybrid-pi (π) common emitter transistor model, validity of hybrid- π model, variation of hybrid – π parameters, Millers theorem and its dual, the CE short circuit current gain, current gain with resistive load, gain-bandwidth product.

Multistage Amplifiers: Distortion in amplifiers, Analysis of cascaded BJT amplifier, Darlington pair, Coupling schemes-RC coupled amplifier, Transformer coupled amplifier, Direct coupled Amplifier.

UNIT –II:

FEEDBACK AMPLIFIERS: Concept of Feedback and types, Effects of negative feedback on amplifiers characteristics, voltage series, current series, current shunt, and voltage shunt feedback amplifiers.

OSCILLATORS: Classification of oscillators, Barkhausen criterion, RC phase shift oscillator, Wein-bridge oscillator, LC oscillators- Hartley and Colpitts oscillator.

UNIT III

LARGE SIGNAL AMPLIFIERS: Classification, Distortion in amplifiers, class A large signal amplifiers, efficiency of class A amplifier, class B power amplifier, efficiency of class B amplifier, class B push pull amplifier, Complementary symmetry class B push pull amplifiers, class AB push pull amplifier, Single Tuned Amplifier, Principles of Staggered Tuning**.**

UNIT IV

MULTIVIBRATORS: Transistor as a switch, switching times of a transistor. Analysis of Bistable, Monostable and Astable Multivibrators, Schmitt trigger using transistors.

UNIT –V

TIME BASE GENARATORS: General features of a Time Base Signal, Methods of Generating Time Base Wave forms, Basic Principles of Transistor Miller and Bootstrap Time Base Generator, Current Time Base Generator.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Integrated Electronics-Jacob Millman and Christos C. Halkias,1991 Ed -2008,TMH.

REFERENCE BOOKS:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.
3. Microelectric Circuits-Sedra and Smith-5 Ed., 2009, Oxford University press.

4. Electronic Circuit Analysis-K.LalKishore, 2004, BSP.

COURSE OUTCOMES:

At the end of the course, the student will be able to;

1. Understand the concepts of wave shaping circuits
2. Design of multivibrators for various applications,
3. Understand the concepts of Time Base Generators , sampling gates and logic gates
4. Analyzed the different types of amplifiers and oscillators

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(R18A0406) ELECTROMAGNETIC FIELDS & WAVES

OBJECTIVES

The course objectives are:

1. To introduce the student to the coordinate system and its implementation to electromagnetics.
2. To elaborate the concept of electromagnetic waves and their practical applications.
3. To study the propagation, reflection, and refraction of plane waves in different media.

UNIT - I:

Vector Analysis & Co-ordinate system: Vector analysis- Representation, operations-Dot product and cross product, Basics of coordinate system- rectangular, cylindrical and spherical co-ordinate systems.
Electrostatics-I: Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density; Illustrative Problems.

UNIT - II:

Electrostatics-II:

Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Equations for Electrostatic Fields, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Boundary conditions-conductor-Dielectric and Dielectric-Dielectric; Illustrative Problems.

UNIT - III:

Magnetostatics: Biot - Savart's Law , Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Ampere's Force law , Faraday's Law, Displacement Current Density, Maxwell's Equations for time varying fields, Illustrative Problems.

UNIT - IV:

EM Wave Characteristics-I : Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, Relation Between E & H, Wave Propagation in Lossless and Conducting Media, Wave Propagation in Good Conductors and Good Dielectrics, Illustrative Problems.

UNIT - V:

EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal incidence for both perfect Conductors and perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics - Matthew N. O. Sadiku, 4th., Oxford Univ. Press.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K. G. Balmain, 2nd Ed., 2000, PHI.
3. Engineering Electromagnetic - William H. Hay Jr. and John A. Buck, 7thEd., 2006, TMH

REFERENCES BOOKS:

1. Engineering Electromagnetics - Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Electromagnetic Waves and Transmission Lines-Y Mallikarjuna Reddy, University Press.
3. Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.

OUTCOMES

Upon the successful completion of the course, students will be able to;

1. Study time varying Maxwell equations and their applications in electromagnetic problems
2. Determine the relationship between time varying electric and magnetic field and electromotive force
3. Use Maxwell equation to describe the propagation of electromagnetic waves
4. Demonstrate the reflection and refraction of waves at boundaries

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(R18A0407) ANALOG COMMUNICATIONS

COURSE OBJECTIVES:

1. Emphasize on the study of principles of communication theory.
2. Focus on the fundamentals of communication system.
3. Introduce the techniques of transmitting and receiving information signals using analog carrier modulation techniques (AM, FM, PM) and evaluate their performance levels (SNR) in the presence of channel noise.
4. Establish foundation for understanding the relationship among various technical factors useful in the design & operation of a communication system.

UNIT I

AMPLITUDE MODULATION: Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation: Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves: square law Modulator, Switching modulator, Detection of AM Waves: Square law detector, Envelope detector.

DSB-SC modulation: Double side band suppressed carrier modulation, time domain and frequency domain description, Generation of DSBSC Waves: Balanced Modulators, Ring Modulator, Detection of DSBSC waves: Coherent detection, COSTAS Loop.

Radio Transmitters- Classification of Transmitters, AM Transmitter Block diagram and explanation of each block.

UNIT II

SSB MODULATION: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Hilbert Transform & its Properties, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves.

Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave plus Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT III

ANGLE MODULATION: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave. Generation of FM Waves: Indirect FM, Direct FM: Varactor Diode and Reactance Modulator. Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM. , Pre-emphasis & de-emphasis, FM Transmitter block diagram and explanation of each block.

UNIT IV

NOISE: Noise in communication System, White Noise, Narrowband Noise –In phase and Quadrature phase components. Noise Bandwidth, Noise Figure, Noise Temperature, Noise in DSB& SSB System Noise in AM System, Noise in Angle Modulation System, and Threshold effect in Angle Modulation System.

UNIT V

RECEIVERS: Radio Receiver, Receiver Types: Tuned radio frequency receiver, Superhetrodyne receiver- RF section, Frequency mixers, tracking, Intermediate frequency, AGC. Receiver Parameters & Characteristics, FM Receiver and its comparison with AM Receiver.

PULSE MODULATION: Types of Pulse modulation, PAM: Generation (Single polarity, double polarity) and Demodulation. PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM.

TEXTBOOKS:

1. Communication Systems- Simon Haykin, 2nd Edition, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.
3. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition.

REFERENCES:

1. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
2. Communication Systems Second Edition – R.P. Singh, SP Sapre, TMH, 2007.
3. Analog & Digital Communication – K.Sam Shanmugam, Wiley 2005
4. Fundamentals of Communication Systems – John G. Proakis, Masond, Salehi PEA, 2006.
5. Electronic Communication Systems- Modulation & Transmission- Robert J.Schoenbeck, 2nd Edition, PHI

COURSE OUTCOMES:

At the end of the course, the students will be able to

1. Understand the principles of communication theory.
2. Focus on the fundamentals of communication system.
3. Introduce the techniques of transmitting and receiving information signals using analog carrier modulation techniques (AM, FM, PM) and evaluate their performance levels (SNR) in the presence of channel noise.
4. Establish foundation for understanding the relationship among various technical factors useful in the design & operation of a communication system.

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	3	**-/ - /-**	**3**

(R18A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

Course Outcomes:

Students should be able,

- To understand the basic economic principles, forecast demand and supply.
- To estimate cost and understand market structure, pricing practices.
- To interpret the financial results of the organisation.

Unit-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.

Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

Unit-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing;

Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

Unit-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

References:

- Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
- D.N. Dwivedi, Managerial Economics, Vikas Publications.
- Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
- P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
- S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
- M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

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	-	**- / 3 /-**	**1.5**

(R18A0483) ANALOG CIRCUITS LAB

Part – I: Electronic Circuits

Minimum eight experiments to be conducted:

4) Design and Simulation in Simulation Laboratory using any Simulation Software. (Minimum 6 Experiments):

1. Common Emitter Amplifier.
2. Common Source Amplifier.
3. Two Stage RC Coupled Amplifier
4. Current shunt and Voltage Feedback Amplifier
5. Cascade Amplifier.
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. Common base (BJT) / Common gate(JFET) Amplifier.

II) Testing in the Hardware Laboratory (Minimum 2 Experiments):

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley & Colpitt's Oscillators
5. Darlington Pair
6. MOS Common Source Amplifier

Equipments required for Laboratories:

1. For software simulation of Electronic circuits
   i. Computer Systems with latest specifications
   ii. Connected in LAN (Optional)
   iii. Operating system (Windows XP)
   iv. Suitable Simulations software
   v.
2. For Hardware simulations of Electronic Circuits
   i. Regulated Power Supply (0-30V)
   ii. CROs
   iii. Functions Generators
   iv. Multimeters
   v. Components
3. Windows XP/ Linux etc.

Part – II: Pulse Circuits

Minimum eight experiments to be conducted:

1. Linear Wave Shaping.

a. RC Low Pass Circuit for different time constants.
b. RC High Pass Circuit for different time constants.

2. Non – Linear Wave Shaping.
    a. Transfer Characteristics and response of Clippers:
        i. Positive and Negative Clippers
        ii. Clipping at two independent levels
    b. The Steady state output waveform of clsmpers for a square wave input
        i. Positive and Negative Clampers
        ii. Clamping at reference voltage
3. Comparison Operation of Comparators
4. Switching characteristics of a transistor
5. Design a Bistable Multivibrator and draw its waveforms
6. Design a Astable Multivibrator and draw its waveforms
7. Design a Monostable Multivibrator and draw its waveforms
8. UJT relaxation Oscillator

Equipment required for Laboratories:

1. Regulated Power Supply (0-30V)
2. CROs
3. Functions Generators
4. Multimeters
5. Components

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(R18A0484) ANALOG COMMUNICATIONS LAB

Note: Minimum 12 Experiments should be conducted:
All these experiments are to be simulated first using MATLAB, Comsim or any other simulation package and then to be realized in hardware.

LIST OF EXPERIMENTS:

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector.
3. SSB-Sc Modulator & Detector (Phase Shift Method).
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and analysis of AM and FM Signals.
6. Pre-emphasis & de-emphasis.
7. Frequency Division Multiplexing & De multiplexing.
8. Verification of Sampling Theorem.
9. Pulse Amplitude Modulation & Demodulation.
10. Pulse Width Modulation & Demodulation.
11. Pulse Position Modulation & Demodulation.
12. Frequency Synthesizer.
13. AGC Characteristics.
14. PLL as FM Demodulator.

Equipment required for the Laboratory:

1. RPS - 0-30 V.
2. CRO - 0-20 M Hz.
3. Function Generators - 0-1 M Hz.
4. RF Generators - 0-1000 M Hz./0-100 MHz.
5. Multimeters.
6. Lab Experimental kits for Analog Communication.
7. Radio Receiver/TV Receiver Demo kits or Trainees.
8. Spectrum Analyzer – 60 M Hz.
9. Any one Simulation Package.

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	2	**-/-/-**	**0**

MANDATORY COURSE – III

(R18A0014) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES

We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around us. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects this ethos. There is a direct application of this wisdom even in modern times. Idea of an activity-based course on environment protection is to sensitize the students on the above issues through following two type of activities.

UNIT I- ENVIRONMENTAL EDUCATION AND ECOSYSTEMS

Environmental education: Definition and objective. Origin of Environmental sciences from Vedas, Structure and function of an ecosystem, Food chain and Food Web, Ecological Pyramids, Bioaccumulation and Biomagnification.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on importance of Environmental Education

UNIT II- NATURAL RESOURCES

Introduction: definition, Forest resources- Uses, Causes and consequences of deforestation, Water resources-Sources and Uses of Water, Benefits and problems of DAMs, Energy resources-Renewable and Non-renewable energy resources.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Natural Resources

UNIT III- ENVIRONMENTAL POLLUTION

Environmental segments – structure and composition of atmosphere. Pollution – Sources, effects and control of Air, water. Climate change-ozone layer depletion, Global warming/greenhouse effect.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Environmental pollution.

UNIT IV- WASTE MANAGEMENT

Solid waste management: sources, effects and control of municipal waste, bio medical waste – waste management and E-waste.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Cleanliness, segregation of waste and Swacha-Bharath.

UNIT V- Social Issues and the Environment

Concept, threats and strategies of sustainable development, Water conservation-rain water harvesting, Energy conservation, Green activities.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Social Issues and the Environment.

TEXT BOOKS:

5) Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.

6) Text book of Environmental Science and Technology – Dr. M. Anji Reddy 2007, BS Publications.

7) Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

8) Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.

2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham & Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

COURSE OUTCOMES:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of Ecological principles and environmental regulations which in turn help in sustainable development. Understand the complex relationships between natural and human systems.

OPEN ELECTIVE - I

OPEN ELECTIVE I		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	**R18A0451**	**DIGITAL ELECTRONICS**
2	**R18A0551**	**DATA BASE SYSTEMS**
3	**R18A0553**	**DATA STRUCTURES USING PYTHON**
4	**R18A0351**	**INTELLECTUAL PROPERTY RIGHTS**
5	**R18A0352**	**GREEN ENERGY SYSTEMS**
6	**R18A0555**	**DATA VISUALIZATION**

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	3	-/-/-	3

OPEN ELECTIVE - I

(R18A0451) DIGITAL ELECTRONICS

COURSE OBJECTIVES:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinationaland sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,

AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

TEXT BOOK:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt.,Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCES:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning,2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

COURSE OUTCOMES

After the completion of the course, the student will be able to:

1) Analyze different methods used for simplification of Boolean expressions
2) Design and implement Combinational and Sequential circuits.
3) Design and implement Synchronous and Asynchronous Sequential Circuits

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OPEN ELECTIVE - I

(R18A0551) DATABASE SYSTEMS

OBJECTIVES

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations- Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition , 2010.

2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,"Fundamentals of Database System," Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, "An Introduction to Database", Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning, 2009.

OUTCOMES

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

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OPEN ELECTIVE - I

(R18A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. The objective of this course is to provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.

Unit-I

Introduction: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

Unit-II

Parties to IP Rights: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

Unit-III

Ensuring the value of IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

Unit-IV

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

Unit-V

Remedies and IPR Evaluation - GATT - WTO - Role of WTO in solving IPR issues.

REFERENCES:

- A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
- Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
- Intellectual Property Rights: N K Acharya: ISBN: 9381849309
- Intellectual Property Rights: C B Raju : ISBN-8183870341
- Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
- Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

COURSE OUTCOMES

1. It allows students how to prepare and protect the Inventions , start up ideas and rights of patents and copy rights etc.,
2. This subject brings awareness to the students the basic legal aspects at present following at Global level.

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OPEN ELECTIVE - I

(R18A0352) GREEN ENERGY SYSTEMS

COURSE OBJECTIVES:

1. The course aims to highlight the significance of alternative sources of energy.
2. Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

UNIT-I

Introduction:

Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics.

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

Solar Energy Storage And Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants,thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

Energy Efficient Systems: (A) Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

(B) Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Green Buildings: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy

COURSE OUTCOMES:

1. The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
2. Green energy systems and appreciate their significance in view of their importancein the current scenario and their potential future applications.

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OPEN ELECTIVE I

(R18A0555) DATA VISUALIZATION

Course Objectives:

- To learn different statistical methods for Data visualization.
- To understand the basics of R and Python.
- To learn usage of Watson studio.
- To understand the usage of the packages likeNumpy, pandas and matplotlib.
- To know the functionalities and usages of Seaborn.

UNIT I

Introduction to Statistics : Introduction to Statistics, Difference between inferential statistics and descriptivestatistics, Inferential Statistics- Drawing Inferences fromData, RandomVariables, Normal ProbabilityDistribution, Sampling, Sample Statistics and SamplingDistributions.

R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

UNIT II

Data manipulation withR: Data manipulation packages-dplyr,data.table, reshape2, tidyr, Lubridate, Data visualization withR.

Data visualization in Watson Studio: Adding data to datarefinery, Visualization of Data on WatsonStudio.

UNIT III

Python: Introduction toPython, How toInstall, Introduction to JupyterNotebook, Python scriptingbasics, NumpyandPandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and datetime columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools inPython- Introduction to Matplotlib, Basic plots usingmatplotlib, Specialized Visualization Tools usingMatplotlib, Advanced Visualization Tools usingMatplotlib- WaffleCharts, WordClouds.

UNIT V

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.
2. Hands on programming with R by Garrett Grolemund,Shroff/O'Reilly; First edition
3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress
2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc. \
3. The Comprehensive R Archive Network- https://cran.r-project.org
4. https://seaborn.pydata.org/
5. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization.
- Gain knowledge on R and Python
- Understand usage of various packages in R and Python.
- Demonstrate knowledge of Watson studio.
- Apply data visualization tools on various data sets.

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OPEN ELECTIVE I

(R18A0553) DATA STRUCTURES USING PYTHON

OBJECTIVES:

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.

Unit I

Introduction to Python, Installation and Working with Python, Understanding Python variables

Python basic Operators, Understanding python blocks, Python Data Types: Declaring and using Numeric data types: int, float,complex,Using string data type and string operations.

UNIT II

Control Flow- if, if-elif-else,loops ,For loop using ranges, string ,Use of while loops in python,Loop manipulation using pass, continue, break and else,Programming using Python conditional and loops block,Python arrays.

UNIT III

Functions -Calling Functions, Passing Arguments, Keyword Arguments,Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.PowerfulLamda function in python.

UNIT IV

Data Structures-List Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences.

Comprehensions,Dictionary manipulation, list and dictionary in build functions

UNIT V

Sorting:BubbleSort,SelectionSort,InsertionSort,Mergesort,Quicksort.LinkedLists,Stacks,Queues

OUTCOMES: Upon completion of the course, students will be able to

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.

- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
2. R. Nageswara Rao, “Core Python Programming”, dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

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(R18A0408) DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

1. To understand different digital pulse modulation techniques such as PCM and DM.
2. To understand the concepts of various shift keying techniques.
3. To analyze error performance of a digital communication system in presence of noise and other interferences.
4. To understand different source coding and decoding techniques.
5. To study about different error detecting and correcting codes like Block codes, Cyclic Codes.

UNIT I

PULSE DIGITAL MODULATION: Elements of digital communication systems, Advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM), Time Division Multiplexing & Demultiplexing.

DELTA MODULATION: Delta modulation & Demodulation, DM drawbacks, Adaptive delta modulation, Comparison of PCM and DM systems, Noise in PCM and DM systems. Illustrative Problems.

UNIT II

DIGITAL MODULATION TECHNIQUES: Introduction, ASK, FSK, PSK, DPSK, QPSK, similarity of BFSK and BPSK. Coherent reception of ASK, FSK, PSK & Non-coherent detection of ASK and FSK.

DATA TRANSMISSION: Base band signal receiver, Probability of error, Optimum filter, matched filter, Probability of error using matched filter, Eye diagrams, Illustrative Problems.

UNIT III

INFORMATION THEORY: Discrete messages, Concept of amount of information and its properties. Average information, Entropy and its properties, Information rate, Mutual information and its properties, Illustrative Problems.

UNIT IV

SOURCE CODING: Introduction, Shannon's theorem, Bandwidth –S/N trade off, Shannon- Fano coding, Huffman coding, Efficiency calculations, Channel capacity of discrete and analog Channels, capacity of a Gaussian channel, Illustrative Problems.

UNIT V

LINEAR BLOCK CODES: Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of linear block codes, Hamming codes, Cyclic Codes.

CONVOLUTION CODES: Introduction, Encoding of convolution codes, Time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram, Decoding using Viterbi algorithm, Illustrative Problems.

TEXT BOOKS:

1. Digital communications – Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCE BOOKS:

1. Digital and Analog Communication Systems – K.Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.
3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1. Understand basic components of digital communication systems
2. Design Optimum receivers for digital modulation techniques
3. Analyze the error performance of digital modulation techniques
4. Know about different error detecting and error correcting codes

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(R18A0409) LINEAR & DIGITAL IC

COURSE OBJECTIVES:

The main objectives of the course are:

1) To introduce the basic building blocks of linear integrated circuits.
2) To teach the linear and non-linear applications of operational amplifiers.
3) To introduce the theory and applications of analog multipliers and PLL.
4) To teach the theory of ADC and DAC.
5) To introduce the concepts of waveform generation and introduce some special function Ics.

UNIT – I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation – Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT – II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators – Triangular, Sawtooth, Square wave, IC555 Timer – Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL – Block Schematic, Description of Individual Blocks, Applications.

UNIT – III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs – Parallel Comparator Type ADC, Counter Type ADC, Successive Approxiamtion ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT – IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing. TTL Driving CMOS & CMOS Driving TTL, Combinational Logic Ics – Specifications and Applications of TTL-74XX & CMOS 40XX Series Ics – Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT – V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series Ics – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers. Memories – ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS :

1. Communication Systems – Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2004.

REFERENCES BOOKS:

1. Electronic Communications – Dennis Roddy and John Coolean, 4th Edition, PEA, 2004.
2. Electrnic Communication Systems – Modulation and Transmission – Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication – K. Sam Shanmugam, Wiley, 2005.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1) Conceptually understand the baseband signal & system.
2) Identify various elements, processes, and parameters in telecommunications systems, and describe their functions, effects, and interrelationship.
3) Design procedure of AM Transmission & Reception, analyze, measure, and evaluate the performance of a telecommunication system against given criteria.
4) Understand basic knowledge of FM Transmission & Reception.
5) Understand various types of SSB Transmission & reception.

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(R18A0410) ANTENNAS AND WAVE PROPAGATION

COURSE OBJECTIVES:

1. Understand basic terminology and concepts of Antennas.
2. To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
3. Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
4. To have knowledge on antenna operation and types as well as their usage in real time.
5. Aware of the wave spectrum and respective band based antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

UNIT –I

ANTENNA BASICS: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Illustrative Problems. Field Zones, Front – to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem.

THIN LINEAR WIRE ANTENNAS : Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area, Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths, Illustrative Problems.

UNIT –II

VHF, UHF AND MICROWAVE ANTENNAS – I : Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Practical Design Considerations for Monofilar Helical Antenna in Axial and Normal Modes, Horn Antennas – Types, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

VHF, UHF AND MICROWAVE ANTENNAS – II: Micro strip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics, Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features, Illustrative Problems. Lens Antennas – Introduction, Geometry of Non-metallic Dielectric Lenses, Fermat's Principle, Zoning, Applications.

UNIT –III

ANTENNA ARRAYS: Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources – Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, Endfire Arrays, Derivation of their Characteristics and Comparison, BSAs with Non-uniform Amplitude Distributions – General Considerations and Binomial Arrays, Illustrative Problems.

ANTENNA MEASUREMENTS: Introduction, Concepts – Reciprocity, Near and Far Fields, Coordinate System Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3- Antenna Methods)

UNIT –IV

WAVE PROPAGATION – I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts, Ground Wave Propagation (Qualitative Treatment) – Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections. Space Wave Propagation – Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

UNIT –V

WAVE PROPAGATION – II: Sky Wave Propagation – Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multihop Propagation.

TEXT BOOKS:

1. Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Electromagnetic Waves and Radiating Systems–E.C. Jordan and K.G. Balmain, PHI, 2nd ed.,
3. A.Harish, M.Sachidanada," Antennas and Wave Propagation", Oxford University Press,2007

REFERENCE BOOKS:

1. Antenna Theory – C.A. Balanis, John Wiley & Sons, 3rd Ed., 2005.
2. Antennas and Wave Propagation–K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.
5. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.

COURSE OUTCOMES:

Student will be able to

1. Aware of antenna parameter considerations
2. Capable to analyze the designed antenna and field evaluation under various conditions and formulate the electric as well as magnetic fields equation set for far field and near field conditions
3. Understand the array system of different antennas and field analysis under application of different currents to the individual antenna elements
4. Understand the design issues, operation of fundamental antennas and their operation methodology in practice.
5. Design a lens structure and also the bench set up for antenna parameter measurement of testing for their effectiveness.
6. Knowledge about the means of propagation of electromagnetic waves

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(R18A0411) CELLULAR & MOBILE COMMUNICATIONS

COURSE OBJECTIVES:

The course Objectives are

1. To provide the students with an understanding of the cellular concept frequency reuse, handoff strategies.
2. To enable the students to analyze and understand wireless and mobile cellular communication systems over stochastic fading channels .
3. To provide the students with an understanding of Co-channel and Non-Co channel Interference.
4. To give students an understanding of cell coverage for signal and traffic diversity techniques and mobile antennas.
5. To give the students an understanding of frequency management channel assignment and types of handoff.

UNIT I

CELLULAR SYSTEMS:

Limitations of Conventional System , Basic Cellular Mobile System ,First, second ,third and fourth Generation cellular wireless systems .Operation of Cellular System .Uniqueness of Mobile Radio Environment –Fading ,coherence bandwidth, Doppler Spread.

Fundamentals of cellular Radio System Design: concept of frequency reuse channels, Co-channel Interference, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system .Trunking and grade of service

UNIT II

CO-CHANNEL & NON CO-CHANNEL INTERFERENCE:

Measurement of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects, diversity techniques: Space Diversity ,Polarization diversity, frequency diversity and time diversity.

Non-co channel interference-adjacent channel interference, Near End far end interference, effect on coverage and interference by power decrease, antenna height decrease

UNIT III

CELL COVERAGE FOR SIGNAL AND TRAFFIC:

Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation.

UNIT IV

CELL SITE AND MOBILE ANTENNAS:

Space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, Mobile Antennas.

Frequency Management And Channel Assignment : Numbering and grouping, setup access and paging channels ,channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment

UNIT V

HANDOFFS:

Handoff Initiation, types of handoff, delaying handoff, advantages of Handoff, power difference handoff, forced handoff, mobile assisted and soft handoff . Intersystem handoff.

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Wireless Communications – Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.

REFERENCES:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2001.
2. Modern Wireless Communication –Simon Haykin Michael Moher, Persons Eduction,2005.
3. Wireless Communication theory and Techniques,Asrar U.H .Sheikh ,Springer,2004.

COURSE OUTCOMES:

1. The student will be able to understand impairments due to multipath fading channel
2. The student will be able to understand the fundamental techniques to overcome the different fading effects
3. The student will be able to understand co-channel and non co-channel interferences
4. The student will be able to familiar with cell coverage/signal and traffic, diversitytechniques and mobile antennas
5. The student will be able to understand the frequency management, channel assignment and types of handoffs

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PROFESSIONAL ELECTIVE – I

(R18A0572) COMPUTER ORGANIZATION AND OPERATING SYSTEMS

COURSE OBJECTIVES:

The course objectives are

1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. To study the different ways of communicating with I/O devices and standard I/O interfaces.
4. To study the hierarchical memory system including cache memories and virtual memory.
5. To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
6. To implement a significant portion of an Operating System.

UNIT – I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic Operational Concepts, Bus, Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating Point Representation.

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions – Instruction Cycle.

Memory – Reference Instructions, Input – Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT – II

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control.

THE MEMORY SYSTEM: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual Memories secondary Storage, Introduction to RAID.

UNIT – III:

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

UNIT – IV:

OPERATING SYSTEMS OVERVIEW: Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures-Operating System Services and Systems Calls, System Programs, Operating System Generation.

MEMORY MANAGEMENT: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing Case Studies – UNIX, Linux, Windows

PRINCIPLES OF DEADLOCK: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

UNIT – V:

FILE SYSTEM INTERFACE: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

FILE SYSTEM IMPLEMENTATION: File System Structure, File system Implementation, Directory Implementation, Allocation Methods, and Free-Space Management.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer System Architecture – M. moris mano, 3rd edition, Pearson
3. Operating System Concepts – Abreham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley.

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings 6th Edition, Pearson
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI
3. Fundamentals of Computer Organization and Design – Sivaraama Dandamudi, Springer Int. Edition
4. Operating Systems – Internals and Design Principles, Stallings, 6th Edition – 2009, Pearson Education.
5. Modern Operating Systems, Andrew S Tanenbaum 2nd Edition, PHI
6. Principles of Operating System, B. L. Stuart, Cengage Learning, India Edition.

COURSE OUTCOMES:

Upon completion of the course, students will have thorough knowledge about:

1. Basic structure of a digital computer
2. Arithmetic operations of binary number system
3. The organization of the Control Unit, Arithmetic and Logical Unit, Memory Unit and the I/O unit.
4. Operating system functions, types, system calls.
5. Memory management techniques and dead lock avoidance
6. Operating systems file system and implementation and its interface.

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PROFESSIONAL ELECTIVE – I
(R18A0413) TELEVISION ENGINEERING

COURSE OBJECTIVES:

1. The objectives of the course are:
2. To familiarize the students with Television transmitters and receivers and TV signal transmission.
3. To make them understand different signal processing steps monochrome television.
4. To introduce colour television transmitters and receivers.

UNIT–I:

Introduction: TV transmitter and receivers, synchronization. Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite videosignal,Tvstandards.Camera tubes:image Orthicon,Plumbicon,vidicon, silicon Diode Array vidicon, Comparison of camera tubes, Monochrome TV camera,

TV Signal Transmission and Propagation: Picture Signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW,TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT –II:

Monochrome TV Receiver:

RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM
detection, FM Sound detectors, and typical applications.

UNIT –III:

Sync Separation and Detection: TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection Oscillators: Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit, Deflection Oscillators, deflection drive Ics, Receiver Antennas, Picture Tubes,

UNIT–IV:

Color Television:

Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes.

Color Signal Encoding and Decoding: NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder, chrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, U& V demodulators.

UNIT – V:

Color Receiver: Introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel,Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

Digital TV: Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

TEXT BOOKS:

1. Television and Video Engineering-A.M.Dhake, 2ndEdition.
2. Modern Television Practice –Principles, Technology and Service-R.R.Gallatin, New Age International Publication, 2002.
3. Monochrome and Colour TV-R.R. Gulati, New Age International Publication, 2002.

REFERENCE BOOKS:

1. Colour Television Theory and Practice-S.P.Bali, TMH, 1994.
2. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

COURSE OUTCOMES:

1. Understand TV standards and picture tubes for monochrome TV.
2. Distinguish between monochrome and colour Television transmitters and receivers.
3. Analyze and Evaluate the NTSC and PAL colour systems.

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PROFESSIONAL ELECTIVE – I
(R18A0212) DIGITAL CONTROL SYSTEMS

COURSE OBJECTIVES:

To cater the knowledge of

1. Basic and digital control system for the real time analysis.
2. Design of control systems.
3. To provide comprehensive knowledge of concepts of stability analysis.
4. Design of discrete time systems.
5. To expose the students to the concepts of optimal control for discrete domain.

UNIT – I

SAMPLING AND RECONSTRUCTION: Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, Sample and hold operations.

Z–TRANSFORMS: Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms-Plane analysis of discrete-time control system, Z-Transform method for solving difference equations; Pulse transforms function, Block diagram analysis of sampled–Data systems, Mapping between S-plane and Z-plane.

UNIT – II

STATE SPACE ANALYSIS: State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it‘s Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

CONTROLLABILITY AND OBSERVABILITY: Concepts of Controllability and Observability, Tests for controllability and observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – III

STABILITY ANALYSIS: Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – IV

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS:

Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag, Lead-Lag and Lag- Lead compensators and digital PID controllers.

UNIT – V

STATE FEEDBACK CONTROLLERS AND OBSERVERS: Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman‘s formula. State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control systems – K. Ogata, Pearson Education/PHI, 2nd Edition.
2. Digital Control and State Variable Methods by M.Gopal, TMH.
3. Digital Control System Analysis and Design, 3rd Edition by Charles L. Phillips, H. Troy Nagle.

REFERENCE BOOKS:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering, M.Gopal New age international publishers.
3. Advanced Control Theory by NAGOOR KANI, 2nd Edition, RBA Publications.
4. Digital Control Systems, Design, Identification and Implementation by Landau**,** Iona Dore, ZitoGianluca, Springer1stedition.
5. Digital control systems by R.Isermann, Springer; 1st edition.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to:

1. Learn the basics and digital control system for the real time analysis
2. Design of control systems.
3. Learn comprehensive knowledge of concepts of stability analysis
4. Understand the design of discrete time systems
5. Understand the concepts of optimal control for discrete domain.

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(R18A0485) DIGITAL COMMUNICATIONS LAB

LIST OF EXPERIMENTS

9) Any Six experiments are to be done through hardware:

1. Time Division Multiplexing
2. Pulse Code Modulation & Demodulation
3. Differential Pulse Code Modulation & Demodulation
4. Delta Modulation
5. Amplitude Shift Keying
6. Frequency Shift Keying
7. Phase Shift Keying
8. Differential phase shift keying

Ⅱ. Any Four experiments are to be done using any MATLAB/SCILAB/or any other simulation tools.

1) Quadrature Phase Shift Keying
2) Digital Companding (A-Law & μ-Law)
3) Linear Block Code- Encoder and Decoder
4) Binary Cyclic Code- Encoder and Decoder
5) Convolution Code Encoder & Decoder

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(R18A0486) LDIC LAB

Note: To perform any twelve experiments (choosing at least five from each part).

Part – I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits – Using IC 741
7. IC 565 – PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators – 7805, 7809, 7912.

EQUIPMENT REQUIRED:

1. 20 MHz / 40 MHz / 60 MHz Oscilloscope.
2. 1 MHz Function Generator (Sine, Square, Traingular and TTL).
3. Regulated Power Supply.
4. Multimeter / Volt Meter.

Part – II: HDL Simulation programs:

Programming can be done using any compiler. Download the programs on FPGA / CPLD boards and performance testing may be done using pattern generator / logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys / Equivalentfront end CAD tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with Priority)
4. Design of 8-to-1 multiplexer and 1 x 8 Demultiplexer.
5. Design of 4 bit binary to gray code converter
6. Design of 4 bit comparator
7. Design of Full adder using 3 modeling styles
8. Design of flip flops: SR, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)

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2 -/-/- -

(R18A0521) CYBER SECURITY
(Mandatory Course - IV)

Course objectives:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

Course Outcomes: The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy.

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data

linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley

2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&FGroup.

OPEN ELECTIVE II

OPEN ELECTIVE II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	**R18A1251**	**MANAGEMENT INFORMATION SYSTEMS**
2	**R18A0552**	**INTRODUCTION TO JAVA PROGRAMMING**
3	**R18A1252**	**SOFTWARE PROJECT MANAGEMENT**
4	**R18A0353**	**ENTERPRISE RESOURCE PLANNING**
5	**R18A0354**	**NANO TECHNOLOGY**

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OPEN ELECTIVE II

(R18A1251) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

1) To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
2) To learn how to plan for information systems &implementation
3) To study about security aspects of information systems

UNIT-I:

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

UNIT-II:

Business Applications of Information Systems : E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

UNIT-IV:

Building of Information Systems: System Development Stages, System Development Approaches.

Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.

Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V:

Introduction to Cyber Crime : Cyber Crime Defination and orgin of the word,cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and ndian ITA 2000,Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOK

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCE:

1. Nina Godbole & Sunit Belapure " Cyber Security" Wiley india 2012.
2. Jawadekar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
4. A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
5. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP – https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) – https://magento.com/
8. Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS – http://www.lumina.com
10. OpenRules – Business Rules and Decision Management system – http://openrules.com/

COURSE OUTCOMES:

1) Ability to apply Concepts & applications of Management Information Systems.
2) Ability to perform Information Systems Planning & Implementations.
3) Ability to adapt Cyber crime and information security procedures.

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OPEN ELECTIVE II
(R18A0552) INTRODUCTION TO JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

1) to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
2) use data types, arrays and strings;
3) implement error-handling techniques using exception handling,
4) create and event-driven GUI using AWT components.

UNIT I: OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.

Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, BufferedReader class, Scanner class, StringTokenizer class, inner class.

UNIT II: Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III: Exception handling – Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV: Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V: GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT controls: Labels, button, text field, check box, and graphics.

Layout Manager – Layout manager types: border, grid and flow.

Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

COURSE OUTCOMES:

1) An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high level language;
3) An appreciation of the principles of object oriented programming;
4) An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
5) Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
6) Be able to make use of members of classes found in the Java API.
7) Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
8) Able to develop applications using Applet, awt and GUI Programming.

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OPEN ELECTIVE II

(R18A01252) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience – based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1) Understanding the specific roles within a software organization as related to project and process management
2) Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3) Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

UNIT-I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases .

UNIT-III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

Flows of the Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the

Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

Text Books:

1. Walker Royce, “Software Project Management”, 1998, PEA.
2. Henry, “Software Project Management”, Pearson.

Reference Books:

1. Richard H.Thayer.” Software Engineering Project Management”, 1997, IEEE Computer Society.
2. Shere K.D.: “Software Engineering and Management”, 1998, PHI.
3. S.A. Kelkar, “Software Project Management: A Concise Study”, PHI.
4. Hughes Cotterell, “Software Project Management”, 2e, TMH. 88 5. Kaeron Conway, “Software Project Management from Concept to D

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

1) Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
2) Compare and differentiate organization structures and project structures.
3) Implement a project to manage project schedule, expenses and resource with the application of suitable project management tools

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OPEN ELECTIVE II

(R18A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1) To know the basics of ERP
2) To understand the key implementation of ERP
3) To know the business modules of ERP
4) To evaluate the current and future trends in ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition, 2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

1) To know the strategic importance of Enterprise Resource Planning
2) To Understand and implement ERP in various Sectors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech I Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE II

(R15A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

1) To learn about basis of Nano Materials.
2) In this course we focus on synthetic aspects for the design ofnanostructured materials.
3) We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.
4) The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes(CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of these nanostructures.
5) The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles,nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano-composites,

UNIT-II

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

Electrical properties: Switching glasses with nanoparticles, Electronic conduction with nano-particles.

Optical properties: Optical properties, special properties and the coloured glasses.

Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT–III Synthesis Routes: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV Tools to Characterize Nanomaterials: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT–V Applications of Nanomaterials: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1) Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press-IIM.
2) Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
3) Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press 2004.

REFERENCES BOOKS:

1) Nano: The Essentials by T. Pradeep, McGraw- Hill Education.
2) Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.
3) Transport in Nano structures- David Ferry, Cambridge University press 2000
4) Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
5) Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6) Electron Transport in Mesoscopic systems – S. Dutta, Cambridge University press.
7) Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

COURSE OUTCOMES:

1) Will familiarize about the science of Nano Technology.
2) Will demonstrate the preparation of Nano Technology.
3) Will develop knowledge in characteristic Nano Technology & Nano Materials.

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III Year B.Tech. ECE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A0414) DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES:

1. To understand the basic concepts and techniques for processing signals and digital signal processing fundamentals.
2. To Understand the processes of analog-to-digital and digital-to-analog conversion and relation between continuous-time and discrete time signals and systems.
3. To Master the representation of discrete-time signals in the frequency domain, using z-transform, discrete Fourier transforms (DFT).
4. To Understand the implementation of the DFT in terms of the FFT, as well as some of its applications (computation of convolution sums, spectral analysis).
5. To learn the basic design and structure of FIR and IIR filters with desired frequency responses and design digital filters.
6. The impetus is to introduce a few real-world signal processing applications.
7. To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

UNIT I

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction, Discrete Time Signals & Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and systems.

REALIZATION OF DIGITAL FILTERS: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel forms.

UNIT II

DISCRETE FOURIER SERIES: DFS Representation of Periodic Sequences. Properties of Discrete Fourier Series., Discrete Fourier Transforms: Properties of DFT. Linear Convolution of Sequences using DFT. Computation of DFT: Over-lap Add Method, Over-lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform**.**

FAST FOURIER TRANSFORMS: Fast Fourier Transforms (FFT) – Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT and FFT with General Radix-N.

UNIT III

IIR DIGITAL FILTERS: Analog Filter Approximations – Butterworth and Chebyshev, Design of IIR Digital filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method.

UNIT IV

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, Frequency Response. Design of FIR Filters: Fourier Method. Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT V

MULTIRATE DIGITAL SIGNAL PROCESSING: Introduction, Down sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Applications of Multi Rate Signal Processing.

FINITE WORD LENGTH EFFECTS: Limit cycles, Overflow oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round Off Noise, Methods to prevent Overflow, Dead band effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009.
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCE BOOKS:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008.
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, b Thomson, 2007.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009.
4. Discrete Systems and Digital Signal Processing with MATLAB – Taan S. EIAli, CRC press, 2009.
5. Digital Signal Processing – A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009.
6. Digital Signal Processing – Nagoor Khani, TMG, 2012.

COURSE OUTCOMES:

On completion of the subject the student must be able to:

1. Perform time, frequency and z-transform analysis on signals and systems.
2. Understand the inter relationship between DFT and various transforms.
3. Understand the significance of various filter structures and effects of rounding errors.
4. Design a digital filter for a given specification.
5. Understand the fast computation of DFT and Appreciate the FFT processing.
6. Understand the trade-off between normal and multi rate DSP techniques and finite length word effects.

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III Year B.Tech. ECE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A0415) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

1. To understand the basics of microprocessors and microcontrollers architectures and its functionalities.
2. To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
3. To design and develop Microprocessor/ microcontroller based systems for real time applications using low level language like ALP.
4. To understand the concepts of ARM processor.

UNIT –I

8086 ARCHITECTURE: Architecture of 8086, Register Organization, Programming Model, Memory addresses, Memory Segmentation, Physical Memory Organization, Signal descriptions of 8086- Common Function Signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT –II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Procedures, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT –III

I/O INTERFACE: 8255 PPI, Various Modes of Operation and Interfacing to 8086, D/A and A/D Converter, Stepper motor, Interfacing of DMA controller 8257

INTERFACING WITH ADVANCED DEVICES: Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine, architecture of 8259.

COMMUNICATION INTERFACE: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT –IV

INTRODUCTION TO MICROCONTROLLERS: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs, memory interfacing to 8051

UNIT –V

8051 REAL TIME CONTROL: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

ARM PROCESSOR: Fundamentals, Registers, Current program status register, Pipeline, Interrupt and the vector table.

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller, 3rd Ed., Cengage Learning.
3. ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design – Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application – Ajay. V. Deshmukh, TMGH, 2005.

COURSE OUTCOMES:

After going through this course the student will

1. Learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. Learn hardware and software interaction and integration.
3. Learn the design of microprocessors/microcontrollers-based systems

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III Year B.Tech ECE-II Sem

L	T/P/D	C
3	-/-/-	3

(R18A0513) COMPUTER NETWORKS

Professional Elective - II

COURSE OBJECTIVES:

The students will be able to:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of thecomputer networking area.
3. Introduce the student to advanced networking concepts, preparing the student forentry Advanced Courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as thedesign and Maintenance of individual networks.

UNIT I:

Introduction: Introduction to networks, Internet, Protocols and Standards, The OSI model, Layers in OSI Model, TCP/IP Suite, Addressing, Analog & Digital Signals

Physical Layer: Physical Layer Introduction, Digital Transmission, multiplexing, Transmission media, Circuit switched networks, Datagram networks, Virtual circuit networks, Switch& telephone network

UNIT II:

Data link layer: Introduction, Block coding, Cyclic codes, checksum, Framing, Flow and error control, Noiseless & Noisy channels, HDLC, Point to point protocols

Media Access Sub Layer: Random Access, Controlled access, channelization, IEEE Standards

UNIT III:

Ethernet, Fast Ethernet, Giga bit Ethernet, wireless LANS, Connecting LANs, Backbone networks, Virtual LANs, Wireless WANs, SONET, frame relay, ATM

UNIT IV:

Network Layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, Forwarding, Unicast routing protocols, multicast routing protocols

UNIT V:

Transport Layer: Process to process delivery, TCP and UDP protocols, SCTP ,Data traffic , congestion, Congestion Control, QoS, integrated services, Differentiated services, QoS in Switched networks.

Application Layer: Domain name space, DNS in internet , Electronic Mail, FTP, WWW, HTTP, SNMP, Multi Media, Network Security

TEXT BOOKS:

1. Data Communications and Networking- Behrouz A Forouzan Fourth Edition TMH, 2006.
2. Computer Networks- Andrew S Tanenbaum, 4th Edition, Pearson Education

REFERENCE BOOKS:

1. An Engineering approach to computer Networks- S.Keshav, 2nd Edition, PearsonEducation

2. Computer and communication Networks- Nader F Mir, Pearson Education
3. Data and Computer Communications, G.S.Hura and M. Singhal, CRC Press, Taylor and Francis Group.
4. Data Communications and Computer Networks,P.C.Gupta, PHI
5. Computer Networking : A top-down Approach Featuring the Internet, James F.Kurose, K.W.Rose, 3rd Edition, Pearson Education

COURSE OUTCOMES:

1. Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3.
2. Analyze the requirements for a given organizational structure and select themost appropriate networking architecture and technologies
3. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols
4. Have an understanding of the issues surrounding Mobile and Wireless Networks.
5. Have a working knowledge of datagram and internet socket programming.

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III Year B.Tech. ECE-I Sem

L	T/P/D	C
3	-/-/-	3

PROFESSIONAL ELECTIVE – II

(R18A0412) INSTRUMENTATION ENGINEERING

COURSE OBJECTIVES:

1. An introduction to measurement techniques and instrumentation design and operation
2. The basic concept of units, measurement error and accuracy, the construction and design of measuring devices and circuits, measuring instruments and their proper applications.
3. To learn the working of different types of Signal generators.
4. To learn the basics of oscilloscope and it types.
5. To use different measuring techniques and the measurement of different physical parameters using different transducers.

UNIT – I

BLOCK SCHEMATICS OF MEASURING SYSTEMS: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Millimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT – II

SIGNAL ANALYZERS: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Capacitance-Voltage Meters, Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator.

UNIT – III

OSCILLOSCOPES: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency.

SPECIAL PURPOSE OSCILLOSCOPES: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT – IV

TRANSDUCERS: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Piezoelectric Transducers, Magneto Strictive Transducers.

UNIT – V

BRIDGES: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

MEASUREMENT OF PHYSICAL PARAMETERS: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure, Vacuum level, Temperature Measurements, Data Acquisition Systems.

TEXTBOOKS:

1. Electronic instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCE BOOKS:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems – Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education – 2010.
5. Industrial Instrumentation: T. R. Padmanabham Spiriger 2009.

COURSE OUTCOMES:

Upon a successful completion of this course, the student will be able to:

1. Describe the fundamental concepts and principles of instrumentation
2. Explain the operation of various instruments required in measurements
3. Apply the measurement techniques for different types of tests.
4. To select specific instruments for specific measurement function.
5. Students will understand functioning, specification and application of signal analyzing instruments.

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III Year B.Tech. ECE-II Sem	L	T/P/D	C
	3	-/-/-	3

PROFESSIONAL ELECTIVE – II

(R18A0416) FIBER OPTICAL COMMUNICATIONS

COURSE OBJECTIVES:

1. To realize the significance of optical fiber communications.
2. To understand the construction and characteristics of optical fiber cable.
3. To develop the knowledge of optical signal sources and power launching.
4. To identify and understand the operation of various optical detectors.
5. To under the design of optical systems and WDM.

UNIT I

OVERVIEW OF OPTICAL FIBER COMMUNICATION: Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, V number, Mode coupling, Step Index fibers, Graded Index fibers.

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers.

UNIT II

SIGNAL DISTORTION IN OPTICAL FIBERS: Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses. Information capacity determination, Group delay, Types of Dispersion – Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

UNIT III

FIBER SPLICING: Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints, Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Reliability of LED & ILD.

SOURCE TO FIBER POWER LAUNCHING: Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT IV

OPTICAL DETECTORS:Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT V

OPTICAL SYSTEM DESIGN : Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

Transmission distance, Line coding in Optical links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS:

1. Optical Fiber Communications – Gerd Keiser, Tata Mc Graw-Hill International edition, 4th Edition, 2008.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

RERFERENCE BOOKS:

10) Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

COURSE OUTCOMES:

At the end of the course the student will be able to:

1. Understand and analyze the constructional parameters of optical fibers.
2. Be able to design the optical system.
3. Estimate the losses due to attenuation, absorption, scattering and bending.
4. Compare various optical detectors and choose suitable one for different applications.

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III Year B.Tech. ECE - II Sem **LT/P/D C**

3 -/-/- 3

(R18A1205)ARTIFICIAL INTELLIGENCE

Course Objectives: To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents **Basic Search Strategies**: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning

Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non- monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice- Hall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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III Year B.Tech. ECE-II Sem	L	T/P/D	C
	-	-/3/-	1.5

(R18A0487) MICROPROCESSORS AND MICROCONTROLLERS LAB

Note: - Minimum of 12 experiments has to be conducted

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify Interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

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III Year B.Tech. ECE-II Sem	L	T/P/D	C
	-	-/3/-	1.5

(R18A0488) DIGITAL SIGNAL PROCESSING LAB

Note:

1. Minimum of 12 experiments has to be conducted.
2. The programs shall be implemented in software (Using MATLAB / Lab view / C programming/ Equivalent) and hardware (Using TI / Analog devices / Motorola / Equivalent DSP processors).

List of Experiments:

1. To find DFT / IDFT of given DT signal
2. Program to obtain Linear Convolution of two finite length sequences
3. Program for computing Auto-correlation.
4. To find frequency response of a given system (in Transfer Function/ Differential equation form).
5. Implementation of FFT of given sequence
6. Determination of power spectrum of a given signal(s).
7. Implementation of LP FIR filter for given sequence
8. Implementation of HP FIR filter for given sequence
9. Implementation of LP IIR filter for given sequence
10. Implementation of HP IIR filter for given sequence
11. Generation of sinusoidal signal through filtering
12. Generation of DTMF signals
13. Implementation of Decimation Process
14. Implementation of Interpolation Process
15. Implementation of I/D sampling rate converters
16. Audio application such as to plot a time and frequency display of microphone plus a cosine using DSP. Read a .wav file and match with their respective spectrograms.
17. Impulse response of first order and second order systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. ECE-I Sem

L	T/P/D	C
2	-/-/-	-

MANDATORY COURSE – V
(R18A0007) INDIAN CONSTITUTION

INTRODUCTION

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

COURSE OBJECTIVES:

1) To enable the students to understand the constitution's origin and its power.
2) To enable the students to analyze the political principles.
3) To enable the students to be aware of their fundamental rights and duties.

UNIT –I

Meaning of constitution law and constitutionalism
Historical perspective of the constitution of India
Salient features and characteristics of the constitution of India

UNIT –II

Scheme of fundamental rights
The scheme of the fundamental duties and its legal status
The Directive Principles of State Policy- its importance and implementation

UNIT –III

Federal structure and distribution of legislative and financial powers between the Union and the States
Parliamentary Form of Government in India-the constitution powers and status of the president of India
Amendment of the Constitutional Powers and Procedure

UNIT –IV

The historical perspectives of the constitutional amendments in India.
Emergency provisions: National Emergency, President Rule, Financial Emergency
Local self government-Constitutional scheme in India

UNIT –V

Scheme of fundamental Right to Equality
Scheme of fundamental Right to certain Freedom under Article 19
Scope of the Right to Life and Personal Liberty under Article 21

COURSE OUTCOMES:

Students will be able to:

1) improve their knowledge about Indian constitution
2) value their identity and exercise their fundamental rights.
3) understand how differently government bodies function.

OPEN ELECTIVE III

OPEN ELECTIVES III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	**R18A0452**	**ROBOTICS & AUTOMATION**
2	**R18A0453**	**INTERNET OF THINGS & ITS APPLICATIONS**
3	**R18A0553**	**OPERATING SYSTEM CONCEPTS**
4	**R18A1253**	**SOFTWARE TESTING TECHNIQUES**
5	**R18A0355**	**TOTAL QUALITY MANAGEMENT**
6	**R18A0251**	**ELECTRICAL SYSTEMS & APPLICATIONS**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem

L	T/P/D	C
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OPEN ELECTIVE III
(R18A0452) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

1) To study overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) To study in detail about Robotics and sensors.
3) To study about AVR RISC Microcontroller architecture in detail.
4) To study about ARM Processor in detail.
5) To study about Artificial Intelligence in Robotics.

UNIT -I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

The AVR RISC microcontroller architecture: Introduction , AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory ,EEPROM ,I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM Processor: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

[1] Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning

[2]Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education, India2003.

[3]ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N.

Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

[1] M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.
[2] Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech
[3] Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to
1) Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) Understand in detail about Robotics and sensors.
3) Understand AVR RISC Microcontroller architecture in detail.
4) Understand about ARM Processor in detail.
5) Understand about Artificial Intelligence in Robotics.

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OPEN ELECTIVE III

(R18A0453) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

1) To study IoT Networking Core
2) To study IoT related network fundamentals
3) To study IoT Architecture.
4) To study IoT Application Development procedure
5) To study various case studies and IoT applications.

Unit 1: The IoT Networking Core :

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

Unit 2: Network Fundamentals:

Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

Unit 3: IoT Architecture:

History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis. The Architecture The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

Unit 4: IoT Application Development:

Application Protocols MQTT, REST/HTTP, CoAP, MySQL.

Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools

Unit 5: Case Study & IoT Applications:

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, “Mobile Computing,” Tata McGraw Hill, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

At the end of the course, the student will be able to

1) Understand IoT Networking Core
2) Understand IoT related network fundamentals
3) Understand IoT Architecture.
4) Understand IoT Application Development procedure
5) Understand various case studies and IoT applications.

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(OPEN ELECTIVE - III)

(R18A0553) OPERATING SYSTEM CONCEPTS

COURSE OBJECTIVES:

1) To learn the fundamentals of Operating Systems.
2) To learn the mechanisms of OS to handle processes and threads and their communication
3) To learn the mechanisms involved in memory management in contemporary OS
4) Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols To know the components and management aspects of concurrency management

UNIT I:

Introduction, objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

UNIT-II:

Process Management:

Process concept, Process states, threads, **CPU Scheduling** - Scheduling algorithms, multiple processors and real time scheduling. **Process synchronization** – Critical section problems, Peterson's Solution, semaphores, monitors.

UNIT-III:

Memory Management:

Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation. **Virtual memory** – Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

UNIT-IV: **File Management**: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

UNIT-V:

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.

Dead locks: Characterization, Dead lock Prevention, Dead lock Avoidance, Dead lock Detection and Recovery.

TEXT BOOKS:

1. Operating Systems Concepts –Avil Silberschatz j, Peter Galvin, GreyGagne

REFERENCES:

1. Modern Operating Systems –Andrew S. Tanenbaum, PHI
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India

COURSE OUTCOMES:

At the end of the course the students are able to:

1) Create processes and threads.
2) Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3) For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4) Design and implement file management system.
5) For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

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(OPEN ELECTIVE - III)

(R18A1253) SOFTWARE TESTING TECHNIQUES

COURSE OBJECTIVES:

1) Knowing the concepts of Software Engineering and software development life cycle.
2) Understanding the foundations, techniques, and tools in the area of software testing and its practice in the industry.
3) Learning the functional aspect of the various testing techniques.
4) Knowledge of the creation of test cases and usage of testing tools.

UNIT - I INTRODUCTION

Software, Software Engineering, Process Models: Waterfall Model, Spiral Model, Prototyping, V Model. Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester – Independent Verification and Validation.

UNIT - II SOFTWARE TESTING REQUIREMENTS

Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews: Peer Review – Walkthrough - Inspection - Checklists of Review Process - Review Log.

UNIT - III TESTING TECHNIQUES

White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision/Branch Coverage – Basic Path Testing – Control Flow Graph Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques: Boundary Value Analysis – Equivalent Class Partition – Cause-Effect Analysis – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.

UNIT - IV TESTING TYPES

Unit Testing, Functional Testing: Smoke Testing – Integration, System Testing, User Acceptance Testing - Non Functional Testing:– Performance Testing – Recovery Testing – Security Testing – Compatibility Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - Data ware House Testing and Business Intelligence Testing – SOA Testing - Mobile Testing.

UNIT - V TEST CASE DESIGN

Definition of Test Case - Standards, Guidelines and Naming Conventions – Characteristics of Good Test Cases – Test Case templates – Creation of Test Case – Requirement Coverage – Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting of Test Execution – Definition of Risk - Risk Based Testing Approach.
Overview of Testing Tools like Winrunner, Loadrunner, Selenium, JMeter.

TEXT BOOKS :

1. Software Testing Techniques – BorisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
3. S.Subashni, N.Satheesh Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, ”SoftwareTesting”, Umayam Publications , First edition, 2013.

REFERENCE BOOKS:

1. Srinivasan Desikan, Gopalaswamy Ramesh,”Software Testing: Principles and Practice”, Pearson Education India, First Impression 2006.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing Concepts and Tools:P.NageshwarRao, dreamtechPress.
4. Art of Software Testing – Meyers, John Wiley.
5. Software Testing in the Real World – Edward Kit, Pearson.

COURSE OUTCOMES:

1) Analyze the strategies for software testing.
2) Identify the issues in test management and testing activity.
3) Apply the suitable testing strategy for a given application.
4) Development of test cases and selection of appropriate testing tool.

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OPEN ELECTIVE III
(R18A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

1) To facilitate the understanding of Quality Management principles and process.
2) To understand Customer focus, Employee focus and their involvement and Supplier Management.

UNIT – I

Introduction, The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

Customer Focus and Satisfaction: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOK:

- Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
- Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

- Beyond TQM / Robert L.Flood
- Total quality management by Paneer Selvam
- Statistical Quality Control / E.L. Grant.
- Total Quality Management:A Practical Approach/H. Lal
- Quality Management/Kanishka Bedi/Oxford University Press/2011
- Total Engineering Quality Management/Sunil Sharma/Macmillan

COURSE OUTCOMES:

1) The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
2) To give the students an overview of TQM, various Quality aspects and importance of Top Management Commitment in any organization for maintaining product /services quality.

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OPEN ELECTIVE III
(R18A0251) ELECTRICAL SYSTEMS & APPLICATIONS

COURSE OBJECTIVES:

1) To introduce the fundamental concepts of electro mechanical energy conversion
2) To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

UNIT- 1: Electrical System Components

LT system wiring components, Selection of Cables, Wires, Switches, Distribution Box, Metering System, Tariff structure, Protection Components- Fuse, MCB, MCCB, ELCB, Inverse current characteristics, Symbols, Single Line Diagram (SLD) of a wiring system, Contactor, Isolator,Relays, MPCB, Electric shock and Electrical safety practices.

UNIT- 2: Residential and Commercial Electrical Systems

Types of residential and commercial wiring systems, general rules and guidelines for installation. Load calculation and sizing of wire, rating of main switch, distribution board and protection devices. Earthing system calculations.Requirements of commercial installation- deciding lighting scheme and number of lamps, earthing of commercial installation, selectionand sizing of components.

UNIT- 3: Illumination Systems

Understanding various terms related to light intensity, Lumens, candle power, lamp efficiency,specific consumption.Various illumination schemes- Incandescent lamps, modern luminaries like CFL, LED andtheir operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

UNIT-4: Industrial Electrical Systems

UPS System-Types, Principle of operation.Battery banks, sizing theUPS and Battery Banks, Selection of UPS and Battery Banks.

UNIT-5: Single Phase AC Motor and Special Motors

Constructional features, Principle of operation, Characteristics, Speed control and Applications of Single phase AC motor, Stepper motor, Brushless DC motor and Universal motor(Qualitative Treatment only).

Text Books

1. S. L. Uppal and G. C. Garg, “Electrical Wiring, Estimating & Costing”, Khannapublishers, 2008.
2. K. B. Raina, “Electrical Design, Estimating & Costing”, New age International, 2007.
3. H. Joshi, “Residential Commercial and Industrial Systems”, McGraw Hill Education, 2008.

REFERENCE BOOKS:

1. N.V. Suryanarayana, *"Utilization of Electrical Power including Electric drives and Electric traction"*, New Age International (P) Limited Publishers, 1st Edition,1994.
2. E. Open Shaw Taylor, *"Utilization of Electric Energy"*, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

1) Maintain/Troubleshoot various lamps and fittings in use.
2) Design Illumination systems for various applications.
3) Utilize effectively the electrical systems in industries.

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(R18A0418) VLSI DESIGN

COURSE OBJECTIVES

1. To understand MOS transistor fabrication processes.
2. To understand basic circuit concepts
3. To have an exposure to the design rules to be followed for drawing the layout of circuits
4. Design of building blocks using different approaches.
5. To have a knowledge of the testing processes of CMOS circuits.

UNIT I

Introduction: Brief Introduction to IC technology MOS, PMOS, NMOS, CMOS & BiCMOS Technologies

Basic Electrical Properties of MOS and BiCMOS Circuits: I_{DS} - V_{DS} relationships, MOS transistor Threshold Voltage-V_T, figure of merit-ω_0 ,Transconductance-g_m, g_{ds} ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT II

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Lambda(λ)-based design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT III

Gate level Design: Logic gates and other complex gates, Switch logic, Alternate gate circuits.

Basic Circuit Concepts: Sheet Resistance R_s and its concepts to MOS, Area Capacitances calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out.

UNIT IV

Subsystem Design: Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters.

VLSI Design styles: Full-custom, Standard Cells, Gate-arrays, FPGAs, CPLDs and Design Approach for Full-custom and Semi-custom devices, parameters influencing low power design.

UNIT V

CMOS Testing: CMOS Testing, Need for Testing, Test Principles, Design Strategies for Test, Chip Level and Board Level Test Techniques**.**

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems, Kamran Eshraghian, Eshraghian Dougles, A. Pucknell, 2005, PHI.
2. Modern VLSI Design – Wayne Wolf, 3 Ed., 1997, Pearson Education.
3. CMOS VLSI Design-A Circuits and Systems Perspective, Neil H.E Weste, David Harris, Ayan Banerjee, 3rd Edn, Pearson, 2009.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011.
2. Principals of CMOS VLSI Design – N.H.E Weste, K. Eshraghian, 2 Ed., Addison Wesley.
3. VLSI Design-K.Lal Kishore,V.S.V.Prabhakar,I.K.International,1997.
4. Introduction to VLSI Design-Mead & Convey,BS Publications,2010.
5. CMOS Logic Circuit Design-John P.Uyemura, Springer, 2007.

COURSE OUTCOMES

1. Acquire quality knowledge about the fabrication process of IC using MOS Transistor
2. Draw the layout of any logic circuits which helps to understand and estimate parasitic of any logic circuit
3. Provide design concepts required to design building blocks of data path using gates.
4. Design simple logic circuits using PLA, PAL, FPGA and CPLD

Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve the testability of the system.

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CORE ELECTIVE – V

(R18A0419) RADAR SYSTEMS

COURSE OBJECTIVES

1. To learn Radar Fundamentals like Radar Equation, Operating frequencies & Applications.
2. To understand the basic concepts of different types of Radars for surveillance & Tracking.
3. To know the various types of tracking techniques involved.
4. To understand Radar Receivers, MTI filters, displays and antennas.

UNIT I

Basics of Radar: Introduction, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Related Problems.

Radar Equation: SNR, Envelope Detector-False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Related Problems.

UNIT-II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Related Problems.

FM-CW Radar: FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT-III

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Angular Accuracy, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT-IV

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT-V

Radar Receivers: Noise Figure and Noise Temperature, Displays – types, Introduction to Phased Array Antennas –Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

Electronic Warfare: Introduction to ESM, ECM and ECCM systems.

TEXT BOOK:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Edition, Tata McGraw-Hill, 2007.

REFERENCES:

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd Edition Tata McGraw-Hill, 2001.
2. Radar: Principles, Technology, Applications-Byron Edde, Pearson Education, 2004.
3. Principles of Modern Radar: Basic Principles-Mark A. Richards, James A. Scheer, William A. Holm, Yesdee,2013.
4. 'Radar Hand Book ' Ed. By M.I Skolnik, 2nd Edition, Tata McGraw Hill.
5. 'Understanding Radar Systems' by Simon Kinsley and Shaun Quegan, Scitech Publishing, McGraw-Hill.

COURSE OUTCOMES

1. Demonstrate an understanding of the factors affecting the radar performance using Radar Range Equation.
2. Analyze the principle of FM-CW radar and apply it in FM-CW Altimeter.
3. Differentiate between a MTI Radar and a Pulse Doppler Radar based on their working principle.
4. Demonstrate an understanding of the importance of Matched Filter Receivers in Radars.
5. Familiarize with the different types of Radar Displays and their application in real time scenario

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(R18A0420) MICROWAVE ENGINEERING

COURSE OBJECTIVES

1. To analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.
2. To Use S-parameter terminology to describe circuits.
3. To explain how microwave devices and circuits are characterized in terms of their "S" Parameters.
4. To give students an understanding of microwave transmission lines.
5. To Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc..
6. To give students an understanding of basic microwave devices (both amplifiers and oscillators).
7. To expose the students to the basic methods of microwave measurements.

UNIT I:

Waveguides & Resonators: Introduction, Microwave spectrum and bands, applications of Microwaves, Rectangular Waveguides-Solution of Wave Equation in Rectangular Coordinates, TE/TM mode analysis, Expressions for fields, Cutoff frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross-section, Mode characteristics - Phase and Group velocities, wavelengths and impedance relations, Rectangular Waveguides – Power Transmission and Power Losses, Impossibility of TEM Modes, losses, Q-factor, Cavity resonators-introduction, Rectangular and cylindrical cavities, dominant modes and resonant frequencies, Q-factor and coupling coefficients, Illustrative Problems.

UNIT II:

Waveguide Components-I: Scattering Matrix - Significance, Formulation and properties, Wave guide multiport junctions - E plane and H plane Tees, Magic Tee, 2-hole Directional coupler, S Matrix calculations for E plane and H plane Tees, Magic Tee, Directional coupler, Coupling mechanisms - Probe, Loop, Aperture types, Wave guide discontinuities - Waveguide Windows, tuning screws and posts, Irises, Transitions, Twists, Bends, Corners and matched loads, Illustrative Problems.

Waveguide Components-II: Ferrites composition and characteristics, Faraday rotation, Ferrite components - Gyrator, Isolator, Circulator.

UNIT III:

Linear beam Tubes: Limitations and losses of conventional tubes at microwave frequencies, Classification of Microwave tubes, **O type tubes** - 2 cavity klystrons-structure, Reentrant cavities, velocity modulation process and Applegate diagram, bunching process and small signal theory Expressions for o/p power and efficiency, Reflex Klystrons-structure, Velocity Modulation, Applegate diagram, mathematical theory of bunching, power output, efficiency, oscillating modes and o/p characteristics, Effect of Repeller Voltage on Power o/p, Significance, types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), Suppression of oscillations, Gain considerations.

UNIT IV:

Cross-field Tubes: Introduction, Cross field effects, Magnetrons-different types, cylindrical travelling wave magnetron-Hull cutoff and Hartree conditions, modes of resonance and PI-mode operation, separation of PI-mode, O/P characteristics.

Microwave Semiconductor Devices: Introduction to Microwave semiconductor devices, classification, applications, Transfer Electronic Devices, Gunn diode - principles, RWH theory, Characteristics, Basic modes of operation - Gunn oscillation modes, LSA Mode, Varactor diode, Parametric amplifier, Introduction to Avalanche Transit time devices (brief treatment only), Illustrative Problems.

UNIT V:

Microwave Measurements: Description of Microwave Bench – Different Blocks and their Features, Precautions; Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types. Network Analyzer, Power Meter, Spectrum Analyzer, Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q. Impedance Measurements.

TEXT BOOKS:

1. Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
2. Microwave and Radar Engineering- M.Kulkarni, Umesh Publications,1998.

REFERENCES :

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.
5. Elements of Microwave Engineering – R. Chatterjee, Affiliated East-West Press Pvt. Ltd., New Delhi,1988.

COURSE OUTCOMES

1. Understand the significance of microwaves and microwave transmission lines
2. Analyze the characteristics of microwave tubes and compare them
3. Be able to list and explain the various microwave solid state devices
4. Can set up a microwave bench for measuring microwave parameters

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(R18A0421) EMBEDDED SYSTEMS DESIGN

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1. Understand the basics of an embedded system.
2. Program an embedded system.
3. To learn the design process of embedded system applications.
4. To understands the RTOS and inter-process communication.
5. To understand different communication interfaces.

UNIT-I INTRODUCTION TO EMBEDDED SYSTEMS

Complex systems and microprocessors-embedding computers, characteristics of embedded computing applications, challenges in embedded computing system design, performance in embedded computing; The embedded system design process-requirements, specification, architecture design, designing hardware and software, components, system integration, design example.

UNIT-II TYPICAL EMBEDDED SYSTEM

Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTs; Memory-ROM, RAM, memory according to the type of interface, memory shadowing, memory selection for embedded systems; Sensors, actuators and other components-sensors, actuators, seven segment LED, relay, piezo buzzer, push button switch, reset circuit, brownout protection circuit, oscillator circuit real time clock, watch dog timer.

UNIT-III EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT

Embedded firmware design approaches-super loop based approach, operating system based approach; Embedded firmware development languages-assembly language based development, high level language based development; Programming in embedded c.

UNIT-IV RTOS BASED EMBEDDED SYSTEM DESIGN

Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling; task communication-shared memory, message passing.

UNIT-V COMMUNICATION INTERFACE

Onboard communication interfaces-I2C, SPI, UART, 1 wire interface, parallel interface; External communication interfaces-RS232 and RS485,USB, infrared, Bluetooth, wi-Fi, zigbee, GPRS; Automotive networks and sensor networks.

TEXT BOOKS:

1. Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
2. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Embedded System Design -frank vahid, tony grivargis, john Wiley.
2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.
3. Embedded Systems – Raj kamal, TMH
4. An embedded Software Primer, David e Simon, Pearson education

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

1. Understand and design the embedded systems
2. Learn the basics of OS and RTOS
3. Understand types of memory and interfacing to external world
4. Understand embedded firmware design approaches

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PROFESSIONAL ELECTIVE - III

(R18A0422) DIGITAL IMAGE PROCESSING

COURSE OBJECTIVES:

The course objectives are:

1. Provide the student with the fundamentals of digital image processing
2. Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.
3. Introduce the students to some advanced topics in digital image processing.
4. Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.

UNIT I

Digital image fundamentals & Image Transforms:- Digital Image fundamentals, Sampling and quantization, Relationship between pixels.

Image Transforms: 2-D FFT , Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT II

Image enhancement (spatial domain) : Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and non linear gray level Transformation, local or neighborhood operation, median filter,spatial domain high-pass filtering.

Image enhancement (Frequency domain): Filtering in Frequency Domain, Obtaining Frequency Domain Filters from Spatial Filters, Generating Filters Directly in the Frequency Domain, Low Pass(smoothing) and High Pass (sharpening) filters in Frequency Domain

UNIT III

Image Restoration: Degradation Mode, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration

UNIT IV

Image segmentation: Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation

Morphological Image Processing : Dilation and Erosion, Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, The Hit or Miss Transformation.

UNIT V

Image Compression:

Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Laooless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing- Rafeal C.Gonzalez, Richard E.Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S. Essakkirajan, T. Veerakumar-TMH,2010

REFERENCE BOOKS:

1 Digital Image Processing and analysis-human and computer visionapplication with using CVIP Tools – Scotte Umbaugh,2nd Ed, CRC Press,2011
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Fundamentals of Digital Image Processing-A.K. Jain, PHI,1989
4. Digital Image Processing and computer Vision-Somka, Halavac,Boyle-Cengage learning (Indian edition)2008,
5. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.
6. Introduction to Image Processing & Analysis-John C.Russ, J. Christian Russ, CRC Press,2010
7. Digital Image Processing with MATLAB & Labview-Vipula Singh Elsevier

COURSE OUTCOMES:

1. Upon Successfully completing the course, the student should:
2. Have an appreciation of the fundamentals of Digital Image Processing including the topics of filtering,transforms and morphology, and image analysis and compession
3. Be able to implement basic image processing algorithums in MATLAB.
4. Have the skill base necessary to further explore advance d topics of Digital Image Processing.
5. Be in a position to make a positive professional contribution in the field of Digital Image Processing.
6. At the end of the course the student should have a clear impression of the breadth and practical scope of Digital Image Processing and have arrived at a level of understanding that is the foundation for most of the work currently underway in this field.

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PROFESSIONAL ELECTIVE – III

(R18A0423) SPEECH AND AUDIO PROCESSING

COURSE OBJECTIVES:

1. Focus on the fundamentals of digital speech processing and their application to coding, synthesis and recognition.
2. Emphasize on how digital signal processing techniques can be applied in problems related to speech communication.
3. Provide an overview of the way in which digital speech processing is being applied in present day applications.

UNIT – I

FUNDAMENTALS OF DIGITAL SPEECH PROCESSING

Anatomy & Physiology of Speech Organs, The process of Speech Production, The Acoustic Theory of Speech Production, Loss less tube models, Digital Speech Processing, Digital models for speech signals.

UNIT – II

TIME DOMAIN MODELS FOR SPEECH PROCESSING

Introduction- Window considerations, Short time energy and average magnitude Short time average zero crossing rate ,Speech vs. silence discrimination using energy and zero crossing, Pitch period estimation using a parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT – III

LINEAR PREDICTIVE CODING (LPC) ANALYSIS

Basic principles of Linear Predictive Analysis: The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution for the Auto Correlation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT – IV

SPEECH ENHANCEMENT

Nature of interfering sounds, Speech enhancement techniques: Single Microphone Approach: spectral substraction, Wiener filter, Multi microphone Approach, Spectral restoration: MMSE-STSA, MMSE-LSA.

UNIT – V

SPEECH & SPEAKER RECOGNITION

Speech recognition

Basic pattern recognition approaches, parametric representation of speech, evaluating the similarity of speech patterns, Accommodating both spectral and temporal variability, Speech Recognition Systems: Isolated Digit Recognition System, Continuous digit Recognition System

Speaker recognition

Recognition techniques, Features that distinguish speakers, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

TEXT BOOKS:

1. Digital processing of speech signals - L.R Rabiner and S.W.Schafer. Pearson Education.
2. Speech Communications: Human & Machine - Douglas O'Shaughnessy, 2nd ed., IEEE Press.
3. Fundamental of speech recognition: L.R Rabinar, Biing-Hwang Jung, Pearson Education.

REFERENCES:

1. Discrete Time Speech Signal Processing: principles and Practice - Thomas F. Quateri 1 ed., PE.
2. Speech & Audio Signal Processing- Ben Gold & Nelson Morgan, 1 ed., Wiley.
3. Speech and Language Processing, Jurafsky, Pearson Education.
4. Voice and Speech Processing, Thomas Parsons, McGraw Hill Series
5. Signal Processing of Speech, Owens F.J., Macmillan New Electronics

COURSE OUTCOMES

Upon completion of the course the student will be able to:

1. Understand the fundamentals of digital speech processing and their application to coding, synthesis and recognition.
2. Emphasize on how digital signal processing techniques can be applied in problems related to speech communication.
3. Provide an overview of the way in which digital speech processing is being applied in present day applications.

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PROFESSIONAL ELECTIVE – III

(R18A0424) MULTIMEDIA AND SIGNAL CODING

COURSE OBJECTIVES:

1. To provide an introduction to the fundamental principles and techniques in Multimedia Signal coding and compression.
2. To give an overview of current multimedia standards and technologies.
3. To provide techniques related to computer and multimedia networks.
4. To provide knowledge related to Multimedia Network Communications and Applications.

UNIT-I:

Introduction to Multimedia: Multimedia, World Wide Web, Overview of Multimedia Tools, Multimedia Authoring, Graphics/ Image Data Types, and File Formats.

Color in Image and Video: Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut Colors, White Point Correction, XYZ to RGB Transform, Transform with Gamma Correction, L*A*B* Color Model. Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Under Color Removal: CMYK System, Printer Gamuts, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, Ycbcr Color Model.

UNIT-II:

Video Concepts: Types of Video Signals, Analog Video, Digital Video.

Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT-III:

Compression Algorithms:

Lossless Compression Algorithms: Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression. **Lossy Image Compression Algorithms:** Transform Coding: KLT And DCT Coding, Wavelet Based Coding. **Image Compression Standards:** JPEG and JPEG2000.

UNIT-IV:

Video Compression Techniques: Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and InterFrame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

UNIT-V:

Audio Compression Techniques: ADPCM in Speech Coding, G.726 ADPCM, Vocoders – Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithms, MPEG-2 AAC, MPEG-4 Audio.

TEXT BOOKS:

1. Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2. Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st Edition, 2009.

REFERENCE BOOKS:

1. Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zorans. Bojkoric, Dragorad A. Milovanovic, 1st Edition, 2002.
2. Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition, 2003.
4. Digital Video Processing – A. Murat Tekalp, PHI, 1996.
5. Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson, 2002.

COURSE OUTCOMES

1. Upon successfully completion of the course, the student should:
2. Understand the fundamentals behind the multimedia signal processing
3. Understand the fundamentals behind the multimedia compression
4. Understand the basic principles behind the existing multimedia compression and communication standards
5. Understand future multimedia technologies and apply the acquired knowledgeto specific multimedia related problems and projects at work
6. Take advance courses in this area.

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(R18A0489) eCAD & VLSI LAB

Note: Minimum of 10 programs from Part –I and 4 programs from Part -II are to be conducted. Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification.

Part –I: VLSI Front End Design programs:

Programming can be done using any complier. Down load the programs on FPGA/CPLD boards and performance testing may be done using pattern generator (32 channels) and logic analyzer apart from verification by simulation with any of the front end tools.

1. HDL code to realize all the logic gates
2. Design and Simulation of adder, Serial Binary Adder, Multi Precession Adder, Carry Look Ahead Adder.
3. Design of 2-to-4 decoder
4. Design of 8-to-3 encoder (without and with parity)
5. Design of 8-to-1 multiplexer
6. Design of 4 bit binary to gray converter
7. Design of Multiplexer/ Demultiplexer, comparator
8. Design of Full adder using 3 modeling styles
9. Design of flip flops: SR, D, JK, T
10. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any Sequence Counter
11. Design of a N- bit Register of Serial- in Serial –out, Serial in parallel out, Parallel in Serial out and Parallel in Parallel Out.
12. Design of Sequence Detector (Finite State Machine- Mealy and Moore Machines).
13. Design of 4- Bit Multiplier, Divider.
14. Design of ALU to Perform – ADD, SUB, AND-OR, 1's and 2's Compliment, Multiplication, and Division.

Part –II: VLSI Back End Design programs:

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design/Transistor-level design/Hierarchical design/Verilog HDL or VHDL design, Logic synthesis, Simulation and verification, Scaling of CMOS Inverter for different technologies, study of secondary effects (temperature, power supply and process corners), Circuit optimization with respect to area, performance and/or power, Layout, Extraction of parasitics and back annotation, modifications in circuit parameters and layout consumption, DC/transient analysis, Verification of layouts (DRC, LVS).

1. Introduction to layout design rules
2. Layout, physical verification, placement & route for complex design, static timing analysis, IR drop analysis and crosstalk analysis of the following:
    1. Basic logic gates
    2. CMOS inverter
    3. CMOS NOR/ NAND gates
    4. CMOS XOR and MUX gates
    5. CMOS 1-bit full adder
    6. Static / Dynamic logic circuit (register cell)
    7. Latch
    8. Pass transistor
3. Introduction to SPICE simulation of NMOS/CMOS circuit
4. SPICE Simulation of basic analog circuits: Inverter/Differential Amplifier
5. Analog Circuit simulation (AC analysis) of CS & CD Amplifier

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(R18A0490) ELECTROMAGNETICS AND MICROWAVE LAB

LIST OF EXPERIMENTS

Part – A: Electromagnetics Lab (Any Five experiments using any simulation software)

1) Find and studies on the several of Standing Wave Pattern along a transmission line when the line is open-circuited, short circuited and terminated by a resistive load at the load end.
2) Familiarization of Smith chart on MATLAB platform, for this experiment need to learn theory Smith chart & basic concept of MATLAB Software.
3) To learn the radiation pattern of different type of antennas Eg: dipole, folded-dipole, 3-element Yagi-Uda antenna and measure HPBW & FNBW for corresponding antennas.
4) Comparative study to find beam width, gain and radiation pattern of a 3-element, 5-element and 7-element parasitic array (Yagi-Uda) antenna.
5) To calculate gain, directivity of a Pyramidal Horn Antenna with obtaining radiation pattern.
6) Familiarization with different signal on Spectrum Analyzer. In the process student can learn the significances of the manufactures specifications etc.

Part – B: Microwave Lab (Any six experiments)

1. Characteristics of gunn diode
2. Characteristics of the reflex klystron tube
3. Attenuation measurement
4. Impedance and Frequency measurement
5. Characteristics of multihole directional coupler
6. Determination of standing wave ratio and reflection coefficient
7. .Study of magic tee

Equipment required for Microwave Laboratory:

1. Regulated Klystron Power Supply
2. VSWR Meter
3. Micro Ammeter - 0 – 500 μA
4. Multimeter
5. CRO
6. GUNN Power Supply, Pin Modulator
7. Reflex Klystron Tube
8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slotted line carriage
12. Probe detector
13. wave guide shorts
14. Directional Coupler
15. E, H, Magic Tee
16. Circulators, Isolator

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(R18A0425) WIRELESS COMMUNICATIONS AND NETWORKS

COURSE OBJECTIVES

1. To provide the students with the fundamental treatment about many practical and theoretical concepts that forms basic of wireless communication to equip the students with various kinds of wireless networks and its operations.
2. To prepare the students to understand the concept of frequency reuse and be able to apply it in the design of mobile cellular system
3. To prepare the students to understand various modulation schemes and multiple access techniques that are used in wireless communications
4. To provide an analytical perspective on the design and analysis the traditional and emerging wireless networks and to discuss the nature of and solution methods to the fundamental problems in the wireless networking
5. To train the students to understand the architecture and operation of various wireless WAN such as GSM, IS-95, GPRS and SMS
6. To train students to understand wireless LAN architectures and operations
7. To prepare students to understand the emerging technique OFDM and its importance in the wireless communications

UNIT -I

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless communication systems-paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems, trends in cellular radio and personal communications. MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation (2G) cellular networks, third generation (3G) wireless networks, wireless local loop (WLL) and LMDS, wireless local area networks (WLANs), Bluetooth and personal area networks (PANs).

UNIT –II:

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geo metry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models-Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model, Indoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model, Ericsson Multiple Breakpoint Model, Attenuation Factor Model, Signal penetration into buildings, Ray Tracing and Site Specific Modeling.

UNIT –III:

Mobile Radio Propagation: Small –Scale Fading and MultipathSmall Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel-Relationship between Bandwidth and Received power, Small-Scale

Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, spectral shape due to Doppler spread in Clarke's model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT –IV

WI-FI AND THE IEEE 802.11 WIRELESS LAN STANDARD: IEEE 802 Architecture, IEEE 802.11 Architecture and Services, 802.11Medium Access Control, 802.11 Physical Layer, Other IEEE 802.11 Standards, Wi-Fi Protected Access.BLUETOOTH AND IEEE 802.15: Overview, radio specification, baseband specification, link manager specification, logical link control and adaptation protocol, IEEE 802.15.

UNIT -V

MOBILE DATA NETWORKS: Introduction, data oriented CDPD network, GPRS and higher data rates, short messaging service in GSM, mobile application protocols.WIRELESS ATM & HIPERLAN: Introduction, Wireless ATM, HIPERLAN, HIPERLAN-2.

TEXT BOOKS:

1. Theodore S. Rappaport (2002), Wireless Communications -Principles Practice,2nd edition, Prentice Hall of India, New Delhi.
2. William Stallings (2009), Wireless Communications and Networks,2nd edition, Pearson Education, India.
3. Kaveh PahLaven, Prashanth Krishna Murthy (2007), Principles of Wireless Networks -A Unified Approach, Pearson Education, India.

REFERENCE BOOKS:

1.Dr. Kamilo Feher (2003), Wireless Digital Communications,Prentice Hall of India, New Delhi.
2.Jochen Schiller (2009), Mobile Communications, 2nd edition, Pearson Education, India.
3. Andreas F. Molisch (2006), Wireless Communications, Wiley –India, New Delhi.

COURSE OUTCOMES

Upon completion of the course the student will be able to:

1. Understand the principles of wireless communications
2. Understand fundamentals of wireless networking
3. Understand cellular system design concepts
4. Analyze various multiple access schemes using wireless communication
5. Understand Wireless WANs and their performance analysis
6. Demonstrate wireless LAN and their specifications
7. Familiar with some of the existing and emerging wireless standards
8. Understand the concept of OFDM

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PROFESSIONAL ELECTIVE – IV

(R18A0426) DETECTION AND ESTIMATION THEORY

COURSE OBJECTIVES:

1) To study various Random Processes in detail.
2) To study Detection Theory in detail.
3) To analyze Linear Minimum MSE Filtering.
4) To study Statistics in detail.
5) To study about estimating the parameters of Random Processes from Data.

UNIT –I : Random Processes: Discrete Linear Models, Markov Sequences and Processes, Point Processes, and Gaussian Processes.

UNIT –II : Detection Theory: Basic Detection Problem, Maximum A posteriori Decision Rule, Minimum Probability of Error Classifier, Bayes Decision Rule, Multiple-Class Problem (Bayes)-minimum probability error with and without equal a priori probabilities, Neyman-Pearson Classifier, General Calculation of Probability of Error, General Gaussian Problem, Composite Hypotheses.

UNIT –III: Linear Minimum Mean-Square Error Filtering: Linear Minimum Mean Squared Error Estimators, Nonlinear Minimum Mean Squared Error Estimators. Innovations, Digital Wiener Filters with Stored Data, Real-time Digital Wiener Filters, Kalman Filters.

UNIT –IV : Statistics: Measurements, Nonparametric Estimators of Probability Distribution and Density Functions, Point Estimators of Parameters, Measures of the Quality of Estimators, Introduction to Interval Estimates, Distribution of Estimators, Tests of Hypotheses, Simple Linear Regression, Multiple Linear Regression.

UNIT –V : Estimating the Parameters of Random Processes from Data: Tests for Stationarity and Ergodicity, Model-free Estimation, Model-based Estimation of Autocorrelation Functions, Power Special Density Functions.

TEXT BOOKS:

1) K. Sam Shanmugan & A.M. Breipohl, “Random Signals: Detection, Estimation and Data Analysis”, Wiley India Pvt. Ltd, 2011.
2) Lonnie C. Ludeman, “Random Processes: Filtering, Estimation and Detection”, Wiley India Pvt. Ltd., 2010.

REFERENCE BOOKS:

1) Steven.M.Kay, “Fundamentals of Statistical Signal Processing: Volume I Estimation Theory”, Prentice Hall, USA, 1998.
2) Steven.M.Kay, “Fundamentals of Statistical Signal Processing: Volume I Detection Theory Prentice”, Hall, USA, 1998.
3) Srinath, Rajasekaran, Viswanathan, “Introduction to Statistical Signal Processingwith Applications”, 2003, PHI.
4) Louis L.Scharf, “Statistical Signal Processing: Detection, Estimation and Time Series Analysis”, 1991, Addison Wesley.

5) Harry L. Van Trees, "Detection, Estimation and Modulation Theory: Part – I", 2001, John Wiley & Sons, USA.
6) Mischa Schwartz, Leonard Shaw, "Signal Processing: Discrete Spectral Analysis – Detection & Estimation", 1975, Mc Graw Hill.

COURSE OUTCOMES:

At the end of the course, the students will be able to

1) Understand various Random Processes in detail.
2) Understand Detection Theory in detail.
3) Understand Linear Minimum MSE Filtering.
4) Understand Statistics in detail.
5) Understand estimating the parameters of Random Processes from Data.

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PROFESSIONAL ELECTIVE – IV

(R18A0427) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

COURSE OBJECTIVES

1. To introduce architectural features of programmable DSP Processors of TI and Analog Devices.
2. To recall digital transform techniques.
3. To give practical examples of DSP Processor architectures for better understanding.
4. To develop the programming knowledge using Instruction set of DSP Processors.
5. To understand interfacing techniques to memory and I/O devices.

UNIT –I:

Introduction to Digital Signal Processing:

Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations:

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II:

Architectures for Programmable DSP Devices:

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III:

Programmable Digital Signal Processors:

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors.

UNIT –IV:

Analog Devices Family of DSP Devices:

Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V:

Interfacing Memory and I/O Peripherals to Programmable DSP Devices:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach to Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing – Jonatham Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI
5. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997 6.Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN 0750679123, 2005

COURSE OUTCOMES

Upon completion of the course the student will be able to:

1. To distinguish between the architectural features of general purpose processors and DSP processors
2. Understand the architectures of TMS 320C54XX and ADSP2100 DSP devices
3. Able to write assembly language programs using instruction set of TMS320C54XX
4. Can interface various devices to DSP Processors

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PROFESSIONAL ELECTIVE - IV

(R18A0428) RF CIRCUIT DESIGN

COURSE OBJECTIVES:

The Course Objectives are:

1. To educate students fundamental RF circuit and system design skills.
2. To introduce students the basic transmission line theory, single and multiport networks, RF component modelling.
3. To offer students experience on designing matching and biasing networks & RF transistor amplifier design.

UNIT-I:

Introduction: Importance of RF Design-Dimensions and Units-Frequency Spectrum-RF Behavior of Passive Components: High Frequency Resistors, High Frequency Capacitors, High Frequency Inductors.-Chip Components and Circuit Board Considerations: Chip Resistors, Chip Capacitors, and Surface Mount Inductors

Review of Transmission Lines: Types of Transmission Lines-Equivalent Circuit representation-R, L, C, G parameters of Different Line configurations-Terminated Lossless Transmission Lines-Special Terminations: Short Circuit, Open Circuit and Quarter Wave Transmission Lines-Sourced and Loaded Transmission Lines: Power Considerations, Input Impedance Matching, Return Loss and Insertion Loss.

UNIT-II:

SingleandMulti-PortNetworks: TheSmithChart:ReflectionCoefficient,Normalized Impedance-Impedance Transformation: Standing wave Ratio, Special Transformation Conditions-Admittance Transformation-Parallel and Series RL & RC Connections-Basic Definitions of Single and Multi-Port Networks-Interconnecting Networks.

RF Filter Design: Scattering Parameters: Definition, Meaning, Chain Scattering Matrix, Conversion Between S-and Z-parameters, Signal Flow Chart Modeling, Generalization-Basic Resonator and Filter Configurations: Low Pass, High Pass, Band Pass and Band Stop type Filters-Filter Implementation using Unit Element and Kuroda's Identities Transformations-Coupled Filters.

UNIT-III:

Active RF Component Modelling: RF Diode Models: Nonlinear and Linear Models-Transistor Models: Large Signal and Small Signal BJT Models, Large Signal and Small Signal FET Models-Scattering Parameter, Device
Characterization.

UNIT-IV:

Matching and Biasing Networks: Impedance Matching Using Discrete Components: Two Component Matching Networks, Forbidden Regions, Frequency Response and Quality Factor, T and Pi Matching Networks-
Amplifier Classes of Operation and Biasing Networks: Classes of Operation and Efficiency of Amplifiers, Biasing Networks for BJT, Biasing Networks for FET.

UNIT-V:

RF Transistor Amplifier Design: Characteristics of Amplifiers-Amplifier Power Relations: RF Source, Transducer Power Gain, Additional Power Relations-Stability Considerations: Stability Circles, Unconditional Stability, And Stabilization Methods-Unilateral and Bilateral Design for Constant Gain-Noise Figure Circles-Constant VSWR Circles.

RF Oscillators and Mixers: Basic Oscillator Model: Negative Resistance Oscillator, Feedback Oscillator Design, Design steps, Quartz Oscillators-

Fixed Frequency High Frequency Oscillator -Basic Characteristics of

Mixers: Concepts, Frequency Domain Considerations, Single Ended Mixer Design, Single and Double Balanced Mixers.

TEXT BOOKS:

1. RF Circuit Design –Theory and Applications -Reinhold Ludwig, Pavel Bsetchko –Pearson Education India, 2000.
2. Radio Frequency and Microwave Communication Circuits –Analysis and Design - Devendra K.Misra –Wiley Student Edition –John Wiley & Sons, Inc.

REFERENCE BOOKS:

1. Radio Frequency and Microwave Electronics –Matthew M. Radmanesh –PEI.
2. RF Circuit Design –Christopher Bowick, Cheryl Aljuni and John Biyler,Elsevier Science, 2008.
3. Secrets of RF Circuit Design -Joseph J.Carr, TMH, 2000.
4. Design of RF and Microwave Amplifiersand Oscillators Peter L.D. Abrif, Artech House, 2000.
5. The Design of CMOS Radio Frequency Integrated Circuits -Thomas H.Lee, 2/e - Cambridge University Press, 2004.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to:

1. Explore fundamental RF circuit and system design skills.
2. Understand the basic transmission line theory, single and multiport networks, RF component modelling.
3. Design matching and biasing networks & RF transistor amplifiers.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	3	**-/ - /-**	**3**

PROFESSIONAL ELECTIVE – V

(R18A0429) SATELLITE COMMUNICATIONS

COURSE OBJECTIVES

1. To prepare the student to excel in basic knowledge of satellite communication principles.
2. To provide students with solid foundation in orbital mechanics and launches for the satellite communication
3. To train the students with the basic knowledge of link design of satellite with a design examples.
4. To provide the better understanding of multiple access systems and earth station technology.
5. To prepare the students with knowledge in satellite navigation and GPS and satellite packet communication

UNIT -I:

Communication Satellite: Orbit and Description: A Brief history of satellite Communication, satellite Frequency Bands, Satellite Systems, Applications, Orbital Period and Velocity, effects of orbital Inclination, Azimuth and Elevation, Coverage angle and slant Range, Eclipse, Orbital Perturbations, Placement of a Satellite in a Geo-Stationary orbit.

UNIT -II:

Satellite Sub-Systems: Attitude and Orbit Control system, TT&C subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment.

Satellite Link: Basic Transmission Theory, System Noise Temperature and G/T ratio, Basic Link Analysis, Interference Analysis, Design of satellite Links for a specified C/N, (With and without frequency Re-use), Link Budget.

UNIT -III:

Propagation Effects:Introduction, Atmospheric Absorption, Cloud Attenuation, Tropospheric and Ionospeheric Scintillation and Low angle fading, Rain induced attenuation, rain induced cross polarization interference. Multiple Access:Frequency Division Multiple Access (FDMA) -Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) -Frame Structure, Burst Structure, Satellite switched TDMA, On-board Processing, Demand Assignment Multiple Access (DAMA) –Types of Demand Assignment, Characteristics, CDMA Spread Spectrum Transmission and Reception.

UNIT -IV:

Earth Station Technology:Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Power Test Methods, Lower Orbit Considerations.Satellite Navigation and Global Positioning Systems:Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers, GPS C/A Code Accuracy, Differential GPS.

UNIT -V:

Satellite Packet Communications:Message Transmission by FDMA: M/G/1 Queue, Message Transmission by TDMA, PURE ALOHA-Satellite Packet Switching, Slotted Aloha, Packet Reservation, Tree Algorithm.

TEXT BOOKS:

1. Satellite Communications –Timothy Pratt, Charles Bostian, Jeremy Allnutt, 2ndEdition, 2003, John Wiley & Sons.
2. Satellite Communications Engineering –Wilbur, L. Pritchand, Robert A. Nelson and Heuri G. Suyderhoud, 2ndEd., Pearson Publications.
3. Digital Satellite Communications-Tri.T.Ha, 2ndEdition, 1990, Mc.Graw Hill.

REFERENCE BOOKS:

1.Satellite Communications-Dennis Roddy, 2ndEdition, 1996, McGraw Hill.
2.Satellite Communications: Design Principles –M. Richcharia, 2ndEd., BSP, 2003.
3.Digital Satellite Communications –Tri. T. Ha, 2ndEd., MGH, 1990.
4.Fundamentals of Satellite Communications –K. N. Raja Rao, PHI, 2004.

COURSE OUTCOMES

1. Student will understand the historical background, basic concepts and frequency allocations for satellite communications
2. Students will demonstrate the orbital mechanics, launch vehicles and launchers
3. Student will demonstrate the design of satellite links for specified C/N with system design examples
4. Students will be able to visualize satellites sub systems like telemetry, tracking, command and monitoring power systems etc.,
   Students will understand the various multiple access systems for satellite communication systems and satellite packet communications

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	3	**-/ - /-**	**3**

PROFESSIONAL ELECTIVE – V

(R18A0430) SPREAD SPECTRUM COMMUNICATIONS

COURSE OBJECTIVES:

The objectives of this course are to make the student

1) Understand the concept of Spread Spectrum and study various types of Spread spectrum sequences and their generation.
2) Understand the principles of Code Division Multiple Access (CDMA) and use of Spread spectrum concept in CDMA
3) Understand various Code tracing loops for optimum tracking of wideband signals viz spread spectrum signals
4) Understand the procedure for synchronization of receiver for receiving the Spread spectrum signal.
5) Study the performance of spread spectrum systems in Jamming environment, systems with Forward Error Correction and Multiuser detection in CDMA cellularradio.

UNIT – I: Introduction to Spread Spectrum Systems: Fundamental Concepts of Spread Spectrum Systems, Pseudo Noise Sequences, Direct Sequence Spread Spectrum, Frequency Hop Spread Spectrum, Hybrid Direct Sequence Frequency Hop Spread Spectrum, Code Division Multiple Access.

Binary Shift Register Sequences for Spread Spectrum Systems: Introduction, Definitions, Mathematical Background and Sequence Generator Fundamentals, Maximal Length Sequences, Gold Codes.

UNIT – II: Code Tracking Loops: Introduction, Optimum Tracking of Wideband Signals, Base Band Delay-Lock Tracking Loop, Tau-Dither Non- Coherent Tracking Loop, Double Dither NonCoherent Tracking Loop.

UNIT – III: Initial Synchronization of the Receiver Spreading Code: Introduction, Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques, Synchronization using a Matched Filter, Synchronization by Estimated the Received Spreading Code.

UNIT – IV: Cellular Code Division Multiple Access (CDMA) Principles: Introduction, Wide Band Mobile Channel, The Cellular CDMA System, Single User Receiver in a Multi User Channel, CDMA System Capacity. Multi-User Detection in CDMA Cellular Radio: Optimal Multi-User Detection, Linear Suboptimal Detectors, Interference Combat Detection Schemes, Interference Cancellation Techniques.

UNIT – V: Performance of Spread Spectrum Systems in Jamming Environments: Spread Spectrum Communication System Model, Performance of Spread Spectrum Systems without Coding. Performance of Spread Spectrum Systems with Forward Error Correction: Elementary Block Coding Concepts, Optimum Decoding Rule, Calculation of Error Probability, Elementary Convolution Coding Concepts, Viterbi Algorithm, Decoding and Bit-Error Rate.

TEXT BOOKS:

1) Rodger E Ziemer, Roger L. Peterson and David E Borth – "Introduction to Spread Spectrum Communication- Pearson, 1st Edition, 1995.
2) Mosa Ali Abu-Rgheff – "Introduction to CDMA Wireless Communications." Elsevier Publications, 2008.

REFERENCE BOOKS:

1) George R. Cooper, Clare D. Mc Gillem – "Modern Communication and Spread Spectrum," McGraw Hill, 1986.
2) Andrew j. Viterbi – "CDMA: Principles of spread spectrum communication," Pearson Education, 1st Edition, 1995.

COURSE OUTCOMES:

On completion of this course student will be able to

1) Generate various types of Spread spectrum sequences and can simulate CDMA system (Both Transmitter & Receiver).
2) Analyze the performance of Spread spectrum systems in Jamming environment and systems with Forward Error Correction.
3) Can provide detection and cancellation schemes for Multiusers in CDMA cellular radio.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	3	**-/ - /-**	**3**

PROFESSIONAL ELECTIVE – V

(R17A01261) NETWORK SECURITY AND CRYPTOGRAPHY

OBJECTIVES:

To make the students

1. To understand the principles of encryption algorithms, conventional and public key cryptography.

UNIT 1:

Introduction to security attacks - services and mechanism - introduction to cryptography - Conventional Encryption: Conventional encryption model - classical encryption techniques - substitution ciphers and transposition ciphers – cryptanalysis – stereography - stream and block ciphers - Modern Block Ciphers: Block ciphers principals - Shannon's theory of confusion and diffusion - fiestal structure - data encryption standard(DES) - strength of DES - differential and linear crypt analysis of DES - block cipher modes of operations - triple DES.

UNIT 2:

IDEA encryption and decryption - strength of IDEA - confidentiality using conventional encryption - traffic confidentiality - key distribution - random number generation - Introduction to graph - ring and field - prime and relative prime numbers - modular arithmetic - Fermat's and Euler's theorem - primality testing - Euclid's Algorithm - Chinese Remainder theorem - discrete algorithms.

UNIT 3:

Principles of public key crypto systems - RSA algorithm - security of RSA - key management – Diffle-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography - Elganel encryption - Message Authentication and Hash Function: Authentication requirements - authentication functions - message authentication code - hash functions - birthday attacks - security of hash functions and MACS.

UNIT 4:

MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital signature algorithm - Authentication Applications: Kerberos and X.509 - directory authentication service - electronic mail security-pretty good privacy (PGP) - S/MIME.

UNIT 5:

IP Security: Architecture - Authentication header - Encapsulating security payloads - combining security associations - key management.

Web Security: Secure socket layer and transport layer security - secure electronic transaction (SET) - System Security: Intruders - Viruses and related threads - firewall design principals - trusted systems.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", Prentice Hall
2.Cryptography and Network Security: Atul Kahate, McGraw Hill

REFERENCE BOOKS:

1. Network Cryptography and Security: C K Shyamala, N Harini,Dr TRPadmanabhan.wiley india,1st Edition .
2. Network Cryptography and Security: Forouzan Mukhopadhyay,Mc Graw Hill.2nd Edition.
3. Information Security, Principles and Practice: Mark Stamp. Wiley India

COURSE OUTCOMES

Upon completion of the course the student will be able to:

1. Acquire an understanding of Network security and its changing character
2. Understand Conventional encryption and cryptography
3. Analyze issues related to network IP security
4. Identify and investigate web security requirements
5. Know the concept of SNMP and design principles of firewall

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: ww.mrcet.ac.in

BACHELOR OF TECHNOLOGY
UNDERGRADUATE PROGRAM

ACADEMIC REGULATIONS
(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ”Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- “Program” means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates tothe society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: ww.mrcet.ac.in

VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
EEE COURSE STRUCTURE

I Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0001	English	2	-	-	2	30	70
2	R18A0021	Mathematics – I	4	1	-	4	30	70
3	R18A0013	Physics	3	-	-	3	30	70
4	R18A0301	Engineering Graphics	1	-	4	3	30	70
5	R18A0501	Programming for Problem Solving	3	-	-	3	30	70
6	R18A0082	Engineering / IT Workshop	-	-	4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-	-	3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-	-	3	1.5	30	70
		TOTAL	**13**	**1**	**14**	**20**	**240**	**560**

I Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0002	Professional English	2	-	-	2	30	70
2	R18A0022	Mathematics – II	4	1	-	4	30	70
3	R18A0012	Engineering Chemistry	3	-	-	3	30	70
4	R18A0502	Object Oriented Programming	3	-	-	3	30	70
5	R18A0201	Basic Electrical Engineering	3	-	-	3	30	70
6	R18A0083	Engineering Physics / Chemistry Lab	-	-	4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-	-	3	1.5	30	70
8	R18A0281	Basic Electrical Engineering Lab	-	-	3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2	-	-	0	100	-
		TOTAL	**17**	**1**	**10**	**20**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

B. Tech (EEE) – III Semester (II Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0023	Mathematics-III	3	0	0	3	30	70
2	R18A0462	Analog Electronics	3	0	0	3	30	70
3	R18A0202	Electrical Machines - I	3	1	0	3	30	70
4	R18A0205	Electromagnetic Fields	3	0	0	3	30	70
5	R18A0206	Electrical Circuit Analysis	3	0	0	3	30	70
6	R18A0366	Elements of Mechanical Engineering	3	0	0	3	30	70
7	R18A0494	Analog Electronics Lab	0	0	3	1.5	30	70
8	R18A0393	Elements of Mechanical Engineering Lab	0	0	3	1.5	30	70
9*	R18A0004	Foreign Language: French	2	-	-	0	100	-
		TOTAL	**20**	**01**	**06**	**21**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

B. Tech (EEE) – IV Semester (II Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0203	Electrical Machines - II	3	1	0	3	30	70
2	R18A0207	Power Systems-I	3	0	0	3	30	70
3	R18A0209	Control systems	3	0	0	3	30	70
4	R18A0404	Switching Theory &Logic Design	3	0	0	3	30	70
5	R18A0061	Managerial Economics & Financial Analysis (MEFA)	3	0	0	3	30	70
6	******	**OPEN ELECTIVE I**	3	0	0	3	30	70
7	R18A0282	Electrical Machines - I Lab	0	0	3	1.5	30	70
8	R18A0284	Electrical Circuits & Simulation Lab	0	0	3	1.5	30	70
9*	R18A0014	Environmental Science	2	-	-	0	100	-
		TOTAL	**20**	**01**	**06**	**21**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE I		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A0451	DIGITAL ELECTRONICS
2	R18A0551	DATA BASE SYSTEMS
3	R18A0553	DATA STRUCTURES USING PYTHON
4	R18A0351	INTELLECTUAL PROPERTY RIGHTS
5	R18A0352	GREEN ENERGY SYSTEMS
6	R18A0555	DATA VISUALIZATION

B. Tech (EEE) – V Semester (III Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0208	Power Systems - II	3	0	0	3	30	70
2	R18A0204	Electrical Machines - III	3	1	0	3	30	70
3	R18A0210	Power Electronics	3	0	0	3	30	70
4	R18A0410	Linear & Digital IC	3	0	0	3	30	70
5	R18A1205 R18A0211 R18A0212	**PROFESSIONAL ELECTIVE I** 1. Artificial Intelligence 2.High Voltage Engineering 3. Digital Control Systems	3	0	0	3	30	70
6	******	**Open Elective II**	3	0	0	3	30	70
7	R18A0283	Electrical Machines -II Lab	0	0	3	1.5	30	70
8	R18A0285	Control Systems & Simulation Lab	0	0	3	1.5	30	70
9*	R18A0006	Technical Communication & Soft Skills Lab	2	-	-	0	100	-
		TOTAL	**20**	**01**	**06**	**21**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A1251	MANAGEMENT INFORMATION SYSTEMS
2	R18A0552	INTRODUCTION TO JAVA PROGRAMMING
3	R18A1252	SOFTWARE PROJECT MANAGEMENT
4	R18A0353	ENTERPRISE RESOURCE PLANNING
5	R18A0354	NANO TECHNOLOGY

B. Tech (EEE) – VI Semester (III Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0213	Electrical Measurements & Instrumentation	3	0	0	3	30	70
2	R18A0415	Microprocessors & Microcontrollers	3	0	0	3	30	70
3	R18A0214	Power System Operation & Control	3	1	0	3	30	70
4	R18A0463 R18A0215 R18A0216	**PROFESSIONAL ELECTIVE II** 1. Systems & Signal Processing 2. Electrical Estimation and Costing 3. Optimization Techniques	3	0	0	3	30	70
5	******	**OPEN ELECTIVE III**	3	0	0	3	30	70
6	R18A0286	Power Electronics & Simulation Lab	0	0	3	1.5	30	70
7	R18A0487	Microprocessors & Microcontrollers Lab	0	0	3	1.5	30	70
8	R18A0490	Mini Project	-	-	6	3	30	70
9*	R18A0521	Cyber Security	2	-	-	0	100	-
		TOTAL	**17**	**01**	**12**	**21**	**340**	**560**

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A0452	ROBOTICS & AUTOMATION
2	R18A0453	INTERNET OF THINGS & ITS APPLICATIONS
3	R18A0554	OPERATING SYSTEM CONCEPTS
4	R18A0355	TOTAL QUALITY MANAGEMENT
5	R18A0251	ELECTRICAL SYSTEMS & APPLICATIONS
6	R18A1253	SOFTWARE TESTING TECHNIQUES

B. Tech (EEE) – VII Semester (IV Year I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0217	Switch Gear and Protection	3	0	0	3	30	70
2	R18A0218	Electrical Drives	3	0	0	3	30	70
3	R18A0219	EHV AC & HVDC Transmission	3	0	0	3	30	70
4	R18A0513 R18A0220 R18A1262	**PROFESSIONAL ELECTIVE III** 1. Computer Networks 2. Advanced Power Electronics 3. Artificial Neural Networks	3	0	0	3	30	70
5	R18A0221 R18A0222 R18A0223	**PROFESSIONAL ELECTIVE IV** 1. Solar & Wind Electrical Systems 2. Quality & Reliability Engineering 3. Power Plant Engineering	3	0	0	3	30	70
6	R18A0287	Power Systems Lab	0	0	3	1.5	30	70
7	R18A0288	Electrical Measurements Lab	0	0	3	1.5	30	70
8	R18A0491	Project - I	-	-	6	3	30	70
		TOTAL	**15**	**-**	**12**	**21**	**240**	**560**

B. Tech (EEE) – VIII Semester (IV Year II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R18A0465	PLC Systems	3	0	0	3	30	70
2	R18A0224 R18A0225 R18A0226	**PROFESSIONAL ELECTIVE V** 1. Industrial and Allied Electrical Systems 2. Power System Dynamics and Stability 3. Electrical Machine Design	3	0	0	3	30	70
3	R18A0227 R18A0228 R18A0229	**PROFESSIONAL ELECTIVE VI** 1. Power Quality & FACTS Devices. 2. Power System Reliability 3. Electrical and Hybrid Vehicles	3	0	0	3	30	70
4	R18A0292	Project - II	-	-	12	6	60	140
		TOTAL	**09**	**-**	**12**	**15**	**150**	**350**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I - YEAR- I- SEM -EEE **L T/P/D C**
2 - / - / - 2

(R18A0001) ENGLISH

COURSE OBJECTIVES:

- To enable students to enhance their lexical, grammatical andcommunicative competence.
- To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
- To familiarize students with the principles of writing to ensure error-free writing.
- To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
- To expose students to various techniques of reading skills which hone their comprehensive skills.

UNIT –I

Chapter entitled "***The Road Not Taken***" *by* Robert Frost
Grammar –Tenses and Punctuation (Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading – Techniques for effective reading-Reading Exercise –Type 1

UNIT – II

Chapter entitled "***Abraham Lincoln's Letter to His Son's Teacher***"
Grammar – Voices, Transitive and Intransitive Verbs
Vocabulary – Synonyms, Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions,apologies).
Reading – Skimming, scanning- Reading Exercise –Type 2

UNIT – III

Chapter entitled "***War***" by L. Pirandello
Grammar –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Comprehension- Reading Exercise – Type 3

UNIT – IV

Chapter entitled "***J K Rowling's Harvard Speech***"
Grammar – Articles, Misplaced Modifiers
Vocabulary – One-Word Substitutes
Writing – Précis Writing
Reading – Intensive and Extensive reading - Reading Exercise – Type 4

UNIT –V

Sentence Structures (phrases and clauses)

Grammar –Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading – Identifying Errors - Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES:

Students will be able to:

- Write formal or informal letters and applications for different purposes.
- Select and extract relevant information through skimming and scanning.
- Utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
- Draft concise emails following professional email etiquette.
- Enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM –EEE **L T/P/D C**

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(R18A0021) MATHEMATICS -I

COURSE OBJECTIVES:

To learn

- The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the Eigen vectors of a given matrix.
- Finding maxima and minima of functions of several variables.
- Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)
- How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
- Solving differential equations using Laplace Transforms.

UNIT I:

MATRICES: Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous).Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:

FUNCTIONS OF SEVERAL VARIABLES: Limit continuity, partial derivatives and total derivative. Jacobian - Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for two variables.

UNIT III:

ORDINARY DIFFERENTIAL EQUATIONS: First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type $f(x) = e^{ax}$, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV:

PARTIAL DIFFERENTIAL EQUATIONS: Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V:

LAPLACE TRANSFORMS: Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first

shifting Theorem, Laplace transform of functions when they are multiplied or divided by “t”, Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function. Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by ”s”, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, KhannaPublishers.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2. Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers.
3. Engineering Mathematics by N.P Bali and Manish Goyal.

COURSE OUTCOMES:

After learning the concepts of this paper the student will be able to

- Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
- Find the extreme values of functions of two variables with / without constraints.
- Solve first and higher order differential equations.
- Solve first order linear and non-linear partial differential equations.
- Solve differential equations with initial conditions using Laplace Transform.

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(R18A0011) APPLIED PHYSICS

COURSE OBJECTIVES:

- To understand dual nature of the matter and behavior of a particle quantum mechanically.
- To understand band structure of the solids and classification of materials.
- To be able to distinguish pure, impure semiconductors and characteristics of PN junction diode.
- To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
- To be able to distinguish ordinary light with a laser light and realize the transfer of light through optical fibers.

UNIT – I

QUANTUM MECHANICS

Wave nature of particles, deBroglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – II

ELECTRONIC MATERIALS

Free electron theory, Fermi level, Density of states, Periodic potential-Bloch's theorem, Kronig – Penny modal, E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials on the basis of energy bands: Metals, semi conductors and insulators.

UNIT – III

SEMICONDUCTOR PHYSICS

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semi conductors, Carrier concentration in intrinsic and extrinsic semi conductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT-IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT – V:

LASERS & FIBER OPTICS

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, types of pumping, lasing action, Construction

and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Attenuation, Optical Fiber in Communication System, Applications of optical fibers.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K.Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

COURSE OUTCOMES:

After completion of studying Applied Physics the student is able to,

- Know the basic principles of quantum mechanics and the importance of behavior of a particle.
- Realize the importance of band structure of solids and their applications in various electronic devices.
- Learn concentration estimation of charge carriers in semiconductors and working principles of PN diode.
- Learn dielectric, magnetic properties of the materials and apply them in material technology.
- Learn the principles and production of LASER beams and transfer of information by optical fiber communication systems.

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B. TECH – I- YEAR –I SEM- EEE	**L**	**T/P/D**	**C**
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(R18A0301) ENGINEERING GRAPHICS

COURSE OBJECTIVES:

- Learn to sketch and take fielddimensions.
- Learn to take data and transform it into graphicdrawings.
- Learn basic engineering drawingformats

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Drawing/Graphics – Various DrawingInstruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

ORTHOGRAPHIC PROJECTION IN FIRST ANGLE ONLY: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines– Parallel and inclined to both planes.

UNIT – III

PROJECTIONS OF PLANES: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

PROJECTIONS OF SOLIDS: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

ISOMETRIC PROJECTIONS: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids.

UNIT – V

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views. Conversion oforthographic views to isometric views – simple objects, Basic Principles of ACAD – Demo Only.

COURSE OUTCOMES:

1. Student's ability to convert sketches to engineered drawings willincrease.
2. Students will be able to draw orthographic projectionsandsections.
3. Student's ability to performbasic sketching techniques willimprove.

TEXT BOOKS:

1. Engineering Drawing, Special Edition-MRCET, McGra hill Publishers, 2017.
2. Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.

REFERENCEBOOKS:

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

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B. TECH – I- YEAR –I SEM- EEE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSEOBJECTIVES

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C to solve problems.

UNIT - I

INTRODUCTION TO COMPUTING – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.
Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types and Operators.

UNIT-II

STATEMENTS-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

FUNCTIONS-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

ARRAYS- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.
STRINGS- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

POINTERS- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.
STRUCTURES- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.

COURSEOUTCOMES:

- Demonstrate the basic knowledge of computer hardware and software.
- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical errors.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- EEE	**L**	**T/P/D**	**C**
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(R18A0082) ENGINEERING WORKSHOP/ IT WORKSHOP

COURSEOBJECTIVES:

- Student able to learn about different tools used in the lab
- Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
- Student able to learn about different Carpentry and Fitting tools

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

TEXT BOOKs:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

COURSEOUTCOMES:

- Students can understand different machine shop operations
- Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
- Student learned about metal cutting processes

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I YEAR- I SEM-EEE **L T/P/D C**
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(R18A0082) IT WORKSHOP LAB

COURSE OBJECTIVES:

- The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point
- PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.
- Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.
- Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.
- HTML introduction for creating static web pages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10,

overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.

Header and Footer

Bullets and Numbering

Drawing Toolbar: Auto shapes, Textboxes, etc

Design Template

Introduction to custom animation.

b) Create a presentation to conduct a creativity session using the following tools:

1. Slide transition
2. Master slide view
3. Insert picture – clipart, image
4. Action button
5. Drawing tool bar – lines, arrows
6. Hyperlink
7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

TEXT BOOKS:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

COURSEOUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage's using HTML.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B. TECH- I YEAR- I SEM-EEE **L T/P/D C**
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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

COURSEOBJECTIVES:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.
- Programming using gcc compiler in Linux.

Week 1:

a) Write a C program to find sum and average of three numbers.
b) Write a C program to find the sum of individual digits of a given positive integer.

Week 2:

a) Write a C program to generate the first n terms of the Fibonacci sequence.
b) Write a C program to generate prime numbers from 1 to n.
c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:

a) Write a C program to check whether given number is perfect number or not.
b) Write a C program to check whether given number is strong number or not.

Week 4:

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to performarithmeticoperations using switch statement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursivefunction.
b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.
b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

a) Write a C program to find both the largest and smallest number in a list ofintegers.
b) Write a C program to Sort the Array in an Ascending Order
c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.
b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.
b) Write a C program that uses functions to delete n Characters from a given position in a

given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

Week 12:

a) Write C program to count the number of lines, words and characters in a given text.

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V.RAjaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers
5. Mastering C, K.R.Venugopal and S.R.Prasad, TMH Publishers.

COURSEOUTCOMES:

- Acquire knowledge about the basic concept of writing a program.
- Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Understand the Role of Functions involving the idea of modularity.
- Understand the Concept of Array and pointers dealing with memory management.
- Learn Structures and unions through which derived data types can be formed.

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B. TECH- I YEAR- I SEM-EEE **L T/P/D C**
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(R18A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

COURSEOBJECTIVES:

- To expose students to a variety of self-instructional, learner-friendly modes of language learning
- To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
- To enable students to overcome public speaking anxiety and equip them to become employable.
- To familiarize students with formal telephonic expressions by means of appropriate tone.
- To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I
CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking Activity - JAM Session- Greetings –Taking Leave – Introducing Oneself and Others.

UNIT –II
CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation
ICS Lab: Situational Dialogues/Role Plays - MakingRequests and Seeking Permissions.

UNIT –III
CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)
ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IV Processor
   a) Speed –2.8 GHZ
   b) RAM –512 MB Minimum

c) HardDisk –80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

COURSEOUTCOMES:

Students will be able to:

- Understand the importance of learning phonetics.
- Learn how to pronounce words using phonetic transcription.
- Know the importance of speaking English with rhythm and intonation.
- Effectively participate in JAM session.
- Use polite expressions in all formal situations.
- Effectively communicate through telephone.

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B. TECH- I YEAR- II SEM-EEE **L T/P/D C**
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(R18A0002) PROFESSIONAL ENGLISH

COURSEOBJECTIVES:

- To enrich students to express themselves appropriately and fluently in professional contexts.
- To enhance their employability through regular participation in group discussions and interview skills.
- To lay foundation with writing strategies for the future workplace needs.
- To acquaint students with different components of professional presentation skills.
- To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I

Listening - Bill Gate's TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects and Persons
Grammar - Finite and Non-finite verbs
Vocabulary - Business Vocabulary
Writing - Paragraph Writing

Unit –II

Listening - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

Unit –III

Listening - Sample Interviews (videos)
Speaking - Mock Interviews
Grammar - Direct and Indirect Speech
Vocabulary - Standard Abbreviations (Mini Project)
Writing - Job applications I (Cover Letter)

Unit – IV

Listening - Telephonic Interviews
Speaking - Telephonic Expressions
Grammar - Auxiliary verbs
Vocabulary - Word Analogy-I
Writing - Job Application II (Resume)

Unit – V

Listening - Tanmay Bhakshi's ITU interview
Speaking - Professional Etiquette
Grammar - Common Errors
Vocabulary - Word Analogy-II

Writing - Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSEOUTCOMES:

Students will be able to:

- Draft coherent and unified paragraphs with adequate supporting details.
- Demonstrate problem solving skills, decision-making skills, analytical skills.
- Comprehend and apply the pre-interview preparation techniques for successful interview.
- Achieve expertise in writing resume and cover letter formats.
- Understand the steps of writing 'Reports and Abstract'.

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B. TECH- I YEAR- II SEM-EEE

L	T/P/D	C
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(R18A0022) MATHEMATICS-II

COURSEOBJECTIVES:

- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
- To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
- Evaluation of improper integrals using Beta and Gamma functions.
- Evaluation of multiple integrals.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I:

SOLUTIONS OF ALGEBRAIC, TRANSCENDENTAL EQUATIONS AND INTERPOLATIONSOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae.Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II:

NUMERICAL METHODS - NUMERICAL INTEGRATION: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

CURVE FITTING: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

UNIT III:

BETA AND GAMMA FUNCTIONS: Introduction of improper integrals-Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

UNIT IV:

DOUBLE AND TRIPLE INTEGRALS: Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

UNIT V:

VECTOR CALCULUS: Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Advanced Engineering Mathematics by Michael Greenberg – Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

COURSEOUTCOMES:

After learning the contents of this paper the student must be able to

- Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
- Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
- Find a numerical solution for a given differential equation.
- Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
- Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.TECH- I- YEAR- II- SEM –EEE

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3	-/-/-	3

(R18A0013) ENGINEERING CHEMISTRY

COURSEOBJECTIVES:

- To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
- To analyze microscopic chemistry in terms of atomic and molecular orbitals.
- To analyze water for its various parameters and its significance in industrial and domestic applications.
- To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
- To analyze different types of fuels and their applications in various engineering fields.

UNIT-I:

Electrochemistry and Corrosion

Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

UNIT -II:

Atomic and Molecular Structure

Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

UNIT -III:

Water and its Treatment

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

UNIT-IV:

Organic Reactions

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic addition reactions;

addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

UNIT-V:

Energy Sources

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal-proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited ,2018.

REFERENCE BOOKS:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, NewDelhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

COURSEOUTCOMES:

The basic concepts included in this course will help the student to:

- Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
- Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
- Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
- Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
- Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

ECH- I- YEAR- II- SEM –EEE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0502)OBJECT ORIENTED PROGRAMMING

COURSE OBJECTIVES

1. To teach the student the concepts of object oriented and generic programming.
2. To differentiate between object oriented programming and procedural programming.
3. To design applications using object oriented features
4. To teach the student to implement object oriented concepts

UNIT I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Encapsulation, Inheritance and Polymorphism, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures & Loops.

UNIT-II

Functions, Classes and Objects:

Introduction of Classes, Class Definition, Defining a Members,Objects,Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friend Functions.

UNIT-III

Constructors, Destructors, Inheritance:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Multiple Constructors in a Class, Destructors.

Inheritance : Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

UNIT-IV

Pointers, Virtual Functions and Polymorphism:

Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Overloading- Function Overloading, Operator overloading.

UNIT-V

Templates and Exception handling:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters.

Exception handling: Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

TEXT BOOKS:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt,TMH.

REFERENCE BOOKS:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Educ

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B.TECH- I- YEAR- II- SEM –EEE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0201) BASIC ELECTRICAL ENGINEERING

COURSEOBJECTIVES:

- This course introduces the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
- The emphasis is laid on the basic elements in electrical circuits.
- Analysis of Circuits Which Includes Network Analysis & Network Theorems.
- Analysis of Single Phase AC Circuits, Magnetic Circuits and Basic Treatment of Single Phase Transformers and DC Machines is introduced.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,

Network Theorems**:** Thevenin's theorem, Norton's theorem, MaximumPower Transfer theorem and Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form, Complex and Polar forms of representation. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Phase and Phase difference, Concept of Power Factor, Real, Reactive and Complex power, Illustrative Problems.

UNIT –IV:

Electrical Machines (elementary treatment only):

Single phase transformers: principle of operation, constructional features and emf equation.

DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations:

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

COURSEOUTCOMES:

At the end of this course the student would get

- A thorough knowledge of the basic RLC circuit elements
- Understanding of the basic concepts of networks and circuits with RLC
- Concepts of single phase AC circuits
- Network theorems and their application to solve problems in Network analysis
- Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH- I YEAR – II- SEM - EEE **L T/P/D C**
- -/4/- 2

(R18A0083) ENGINEERING PHYSICS/ CHEMISTRY LAB
(Any 8 experiments compulsory)

COURSEOBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics and electronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physics lab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. C-R circuit – Time Constant of RC circuit
8. Characteristics of LED.
9. Characteristics of a Solar cell.
10. Evaluation of numerical aperture of optical fiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**,V.G.S.publications.
2. Engineering physics practical lab manual –**MRCET.**

COURSEOUTCOMES

- The students learn the concepts of error analyze and try to formulate new solutions to the problems related to engineering physics.
- B.Tech students basically learning the mechanical behavior of the wire and practically determining the elastic constant. Transverse and longitudinal waves are practically studied. Variation of the magnetic fields along with terrestrial magnetism is practicallystudied.
- Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determined experimentally.
- Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practically studied.
- The students learn experimental skills to design new experiments suitable for requirements in different fields (industrial, medical, scientific fields etc.)

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

ECH- I YEAR – II- SEM - EEE	**L**	**T/P/D**	**C**
	-	**-/4/-**	**2**

(R18A0083) ENGINEERING CHEMISTRY LAB
(Any Eight Experiment Compulsory)

COURSE OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

- Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
- Practical implementation of fundamental concepts.
- The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTA method.

Instrumental Methods:

Colorimetry:

2. Determination of Ferrous iron in cement by Colorimetric method
3. Estimation of Copper by Colorimetric method.

Conductometry:

4. Estimation of HCl by Conductometric titrations.
5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:

6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

Preparation:

8. Preparation of Aspirin.

Physical properties:

9. Determination of Viscosity of sample oil by Redwood Viscometer.
10. Determination of Surface Tension of a given liquid by Stalagmometer.

TEXT BOOKS:

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

REFERENCE BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.

COURSE OUTCOMES:

At the end of the course students will be able to

- Estimate the total hardness present in a sample of water.
- Select lubricants for various purposes and determine the surface tension of a given liquid.
- Prepare synthetic drug molecule.
- Determine the strength of an acid by conductometric and potentiometric methods.
- Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH- I YEAR – II- SEM - EEE **L T/P/D C**
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(R18A0582) OBJECT ORIENTED PROGRAMMING LAB

COURSE OBJECTIVES:

- To strengthen problem solving ability by using the characteristics of an object-oriented approach.
- To design applications using object oriented features
- To handle Exceptions in programs.
- To teach the student to implement object oriented concepts

Week 1:
Basic C++ Programs
Week2:
a) Write a C++ program to find the sum of individual digits of a positive integer.
b) Write a C++ program to generate the first n terms of the sequence.
Week 3:
a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
b) Write a C++ program to find both the largest and smallest number in a list of integers.
Week 4:
a) Write a C++ program to sort a list of numbers in ascending order.
b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation
Week 5
a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
b) Program to illustrate default constructor, parameterized constructor and copy constructors
c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:
a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.
b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.

b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.

d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

a) Single inheritance b) Multiple inheritance c)Multi level inheritanced)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

a) Write a Template Based Program to Sort the Given List of Elements.

b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.

b) Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

TEXT BOOKS:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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ECH- I YEAR – II- SEM - EEE

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-	-/3/-	1.5

(R18A0281) BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

To Design Electrical Systems,

- To Analyze A Given Network By Applying Various Network Theorems.
- To Expose The Students To The Operation Of DC Generator
- To Expose The Students To The Operation Of DC Motor and Transformer.
- To Examine The Self Excitation In DC Generators.

CYCLE – I

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Superposition theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

CYCLE - II

7. Magnetization characteristics of DC shunt generator.
8. Swinburne's test on DC shunt machine.
9. Brake test on DC shunt motor.
10. OC & SC tests on single phase transformer.
11. Load test on single phase transformer.

NOTE: Any 10 of Above Experiments Are To Be Conducted

COURSE OUTCOMES:

After successfully studying this course, students will:

- Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
- Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines
- Acknowledge the principles of operation and the main features of electric machines and their applications.
- Acquire skills in using electrical measuring devices.

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ECH- I YEAR – II- SEM - EEE

L	T/P/D	C
2	-/-/-	-

(MANDATORY COURSE)

(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVE

COURSE OBJECTIVES:

This introductory course input is intended:

- To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
- To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

UNIT - I:

COURSE INTRODUCTION - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.
Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity
A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.
Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario.
Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

UNDERSTANDING HARMONY IN THE HUMAN BEING - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.
Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.
Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.
Understanding the harmony in the society (society being an extension of family): Samadhan,

Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:

UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE- Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986,1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA

4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

- The students will be able to obtain happiness and prosperity in their life.
- They will develop harmony at all levels.
- They can have satisfying human behavior throughout their life.

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II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0023) MATHEMATICS – III

COURSE OBJECTIVES:

To learn

- The expansion of a given function by Fourier series.
- The Fourier sine and cosine transforms, properties, inverse transforms, and finite Fourier transforms.
- Differentiation, integration of complex valued functions and evaluation of integrals using Cauchy's integral formula.
- Taylor's series, Laurent's series expansions of complex functions and evaluation of integrals using residue theorem.
- Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification, rotation, reflection, inversion, and Properties of bilinear transformations.

UNIT – I

FOURIER SERIES: Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2π, Fourier series of even and odd functions, Half-range Fourier sine and cosine expansions, Fourier series in an arbitrary interval.

UNIT – II

FOURIER TRANSFORMS: Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms, properties. Inverse transforms and Finite Fourier transforms.

UNIT – III

ANALYTIC FUNCTIONS: Complex functions and its representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem (singly and multiply connected regions) – Cauchy's integral formula – Generalized integral formula.

UNIT – IV:

SINGULARITIES AND RESIDUES: Radius of convergence, expansion of given function in Taylor's series and Laurent series. Singular point – Isolated singular point, pole of order m and essential singularity. Residues – Evaluation of residue by formula and by Laurent series. Residue theorem- Evaluation of improper integrals of the type

(a) $\int_{-\infty}^{\infty} f(x)dx$ **(b)** $\int_{c}^{c+2\pi} f(cos\Theta, sin\Theta)d\Theta$

UNIT – V

CONFORMAL MAPPING: Transformation of z-plane to w-plane by a function, conformal transformation. Standard transformations- Translation; Magnification and rotation; inversion and

reflection, Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2. Higher Engineering Mathematics by B.V Ramana, Tata McGraw Hill.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCEBOOKS:

1. Complex Variables and Applications by James W Brown and Ruel Vance Churchill-Mc Graw Hill
2. Mathematics-III by T K V Iyenger, Dr B Krishna Gandhi, S Ranganatham and Dr MVSSN Prasad, S chand Publications.
3. Advanced Engineering Mathematics by Michael Greenberg – Pearson publishers.

COURSE OUTCOMES:

After going through this course the students will be able to

- Find the expansion of a given function by Fourier series in the given interval.
- Find Fourier sine, cosine transforms and inverse transformations.
- Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
- Findthe Taylor's and Laurent series expansion of complex functions. Solution of improper integrals can be obtained by Cauchy's-Residue theorem.
- Understand the conformal transformations of complex functions can be dealt with ease.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0462) ANALOG ELECTRONICS

COURSE OBJECTIVES

The main objectives of the course are:

- To familiarize the student with the principal of operation, analysis and design of junction diode, BJT and FET transistors and amplifiercircuits.
- To understand diode as a rectifier.
- To study basic principal of filter of circuits and various types

UNIT-I

P-N JUNCTION DIODE: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, Resistance levels(static and dynamic), transition and diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes , Zener diode characteristics.

UNIT-II

RECTIFIERS &FILTERS: P-N Junction as a rectifier ,Half wave rectifier, Full wave rectifier, Bridge rectifier , Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter and Voltage regulation using Zener diode.

UNIT-III

BIPOLAR JUNCTION TRANSISTOR: The Junction transistor, Transistor construction ,Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications. H-parameter representation of a transistor, Analysis of single stage CE amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance.

UNIT-IV

TRANSISTOR BIASING AND STABILISATION: Operating point, the D.C and A.C Load lines, Need for biasing , criteria for fixing operating point, B.J.T biasing, Fixed bias, Collector to base bias, Self-bias techniques for stabilization, Stabilization factors(s, s^{I}, s^{II}), Bias Compensation using Diode Thermal run away, Condition for Thermal stability.

UNIT-V

FIELD EFFECT TRANSISTOR AND FET AMPLIFIER: JFET (Construction, principal of Operation and Volt –Ampere characteristics)-Pinch- off voltage, Small signal model of JFET - FET as Voltage Variable Resistor, Comparison of BJT and FET - MOSFET (Construction, Principle of Operation and symbol), MOSFET characteristics in Enhancement and Depletion modes.

TEXT BOOKS:

1. "Electronic Devices &Circuits", Special Edition–MRCET, McGraw Hill Publications, 2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D.Halkias, McGrawHill.
3. Electronic Devices and Circuits Theory, Boylsted, PrenticeHallPublications.
4. ElectronicDevicesandCircuits, S.Salivahanan, N.Sureshkumar, McGrawHill.
5. Electronic Devices and Circuits, Balbir kumar, shail b.jain, PHI Privated Limted, Delhi.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. Electronic Devices and Circuits,A.P Godse, U.A Bakshi , TechnicalPublications
4. Electronic Devices and Circuits K.S. Srinivasan AnurdhaAgencies

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- Understand and Analyze the different types of diodes, operation and its characteristics
- Design and analyze the DC bias circuitry of BJT and FET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	3	**1/-/-**	**3**

(R18A0202) ELECTRICAL MACHINES – I

COURSE OBJECTIVES:

- To introduce 'Electrical machines' which is is one of the important Subjects of the Electrical Engineering course.
- To understand the basic working principle, constructional details, operational features & characteristics and testing of different types of DC generators and Motors which are widely used in industry
- To expose the students to the concepts of various types of electrical machines and their applications.

UNIT – I

INTRODUCTION TO MAGNETIC CIRCUITS &D.C GENERATORS: Faraday's laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling.

D.C GENERATORS: Action of commutator – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated core – Problems. Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding- Commutation - methods of improving commutation.

UNIT – II

TYPES OF D.C GENERATORS & LOAD CHARACTERISTICS: Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excited and remedial measures. Load characteristics of shunt, series and compound generators – parallel operation of D.C series generators – use of equalizer bar and cross connection of field windings – load sharing.

UNIT – III

D.C. MOTORS: D.C Motors – Types of DC motors, characteristics and application of separately excited, shunt, series and compound motors –Armature reaction and commutation.

UNIT – IV

Speed control of DC Motors: Armature voltage and field flux control methods. Ward - Leonard system. Principle of 3 point and 4 point starters – protective devices.

UNIT – V

Testing of D.C. Machines: Losses – Constant & Variable losses – calculation of efficiency – condition for maximum efficiency. Methods of Testing – direct, indirect and regenerative testing – brake test – Swinburne's test – Hopkinson's test – Field's test – Retardation test – separation of stray losses in a DC motor test.

TEXT BOOKS:

1. Electrical Machines, P.S. Bimbra, Khanna Publishers.
2. Principles of Electrical Machines, V. K. Mehta, Rohit Mehta, S. Chand Publishing.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers.

REFERENCE BOOKS:

1. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
2. Fundamentals of Electric Machines, B. R. Gupta, Vandana Singhal, New Age International Publishers.
3. Electrical Machines, M. V. Deshpande, PHI Learning Private Limited.
4. Electrical Machines, R. K. Srivastava, Cengage Learning.

COURSE OUTCOMES:

At the end of this course the student would get

- Basic knowledge on principles of electromechanical energy conversion
- Knowledge on the Constructional features of DC Generators and DC motors
- Full understanding of the basic principle of operation of these machines
- Clear understanding of Operational characteristics and speed control methods of these machines.
- Testing of different types of DC Generators and DC motors

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II Year B.Tech EEE-I Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0205) ELECTROMAGNETIC FIELDS

COURSE OBJECTIVES:

- To introduce the concepts of electric field, magnetic field.
- Applications of electric and magnetic fields in the development of thetheory for power transmission lines and electrical machines.

UNIT – I

ELECTROSTATICS: Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Potential gradient – Gauss's law– Application of Gauss's Law – Maxwell's first law, div (D)=ρv – Laplace's and Poison's equations.

UNIT – II

DIELECTRICS & CAPACITANCE: Behavior of conductors in an electric field – Conductors and Insulators – Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions – Capacitance – Capacitance of parallel plates– spherical co-axial capacitors— Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity

UNIT – III

MAGNETO STATICS: Static magnetic fields – Biot-Savart's law – Magnetic field intensity (MFI)– MFI due to a straight current carrying filament – MFI due to circular, current Carrying wire – Relation between magnetic flux and magnetic flux density –Maxwell's second Equation, div(B)=0,Ampere's circuital law and its applications viz – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc

UNIT – IV

FORCE IN MAGNETIC FIELDS AND MAGNETIC POTENTIAL: Magnetic force Moving charges in magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors –Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT – V

TIME VARYING FIELDS: Time varying fields – Faraday's laws of electromagnetic induction –Its integral and point forms – Maxwell's fourth equation, Curl (E)=-dB/dt – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current

TEXT BOOKS:

1. "William H. Hayt& John. A. Buck", "Engineering Electromagnetic" ,Mc. Graw-HillCompanies, 7th Edition,2009.
2. "Sadiku", "Electromagnetic Fields", Oxford Publications, 4th Edition, 2009.

REFERENCE BOOKS:

1. "CR Paul and S.A. Nasar", "Introduction to Electromagnetic", McGraw Hill Publications, 3rd Edition, 1997.
2. "Nathan Ida", "Engineering Electromagnetic", Springer (India) Pvt. Ltd. 2ndEdition, 2015.
3. "DJGriffiths","IntroductiontoElectroDynamics",Prentice-HallofIndiaPvt.Ltd,3rdedition, 1999.
4. "J. D Kraus", "Electromagnetics", Mc Graw-Hill Inc. 4th edition, 1992.

COURSE OUTCOMES:

Upon completion of course, student will be able to apply vector calculus to static electric – magnetic fields.

- Compute the force, fields & Energy for different charge & current configurations& evaluate capacitance and inductance.
- Analyze Maxwell's equation in different forms (Differential and integral) in Electrostatic, Magnetic time varying fields.
- Ability to solve the problems in different Magnetic fields
- Ability to analyse moving charges on Magnetic fields.
- Ability to Solve Electromagnetic Relation using Maxwell Formulae.

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	3	**-/-/-**	**3**

(R18A0206) ELECTRICAL CIRCUIT ANALYSIS

COURSE OBJECTIVES:

- This course introduces the analysis of transients in electrical systems, to understand three phase circuits, to evaluate network parameters of given electrical network, to draw the locus diagrams and to know about the network functions
- To prepare the students to have a basic knowledge in the analysis of Electric Networks

UNIT-I

D.C TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C circuits (Series and parallel combinations) for D.C. excitations, Initial conditions, Solution using differential equation and Laplace transform method.

UNIT - II

TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C Series circuits for sinusoidal excitations, Initial conditions, Solution using differential equation and Laplace transform method.

UNIT - III

THREE PHASE CIRCUITS: Phase sequence, Star and delta connection, Relation between line and phase voltages and currents in balanced systems, Analysis of balanced and Unbalanced three phase circuits

UNIT – IV

LOCUS DIAGRAMS & RESONANCE: Series and Parallel combination of R-L, R-C and R-L-C circuits with variation of various parameters. Resonance for series and parallel circuits, concept of band width and Q factor.

UNIT - V

NETWORK PARAMETERS: Two port network parameters – Z,Y, ABCD and hybrid parameters.Condition for reciprocity and symmetry. Conversion of one parameter to other, Interconnection of Two port networks in series, parallel and cascaded configuration and image parameters.

TEXT BOOKS:

1. William HartHayt ,Jack Ellsworth Kemmerly, Steven M.Durbin(2007),Engineering Circuit Analysis, 7 th edition, McGraw-Hill Higher Education, New Delhi, India
2. Joseph A. Edminister(2002),Schaum 'soutline ofElectricalCircuits,4thedition,TataMcGraw Hill Publications, New Delhi, India.
3. A.Sudhakar,ShyammohanS.Palli(2003),ElectricalCircuits,2ndEdition,TataMcGrawHill, New Delhi

REFERENCE BOOKS:

1. C. L. Wadhwa(2008), Electric Circuits Analysis, 2nd edition, New Age International Publications, New Delhi.
2. A.Chakrabarthy(2010),CircuitTheory,5thedition,DhanpatRai&SonsPublications, New Delhi.
3. Van Valkenburg, M. E. (1974), Network Analysis, 3rd Edition, Prentice Hall of India, New Delhi.
4. A Text Book on Electrical Technology. –B L THERAJA, Vol 1, S.Chand Publications.

COURSE OUTCOMES:

After going through this course the student gets thorough knowledge on basic parameters of two port network.

- Will able to articulate in working of various components of a circuit.
- Will be familiar with ac and dc circuits solving.
- Ability to measure Three phase voltages and current, active, reactive powers
- Ability to convert Three phase Star to Three phase Delta circuits and Vice-Versa.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-I SEM **LT/P/D C**

3- /- /- 3

(R18A0366) ELEMENTS OF MECHANICAL ENGINEERING

COURSE OBJECTIVES:

- To give an insight to students about the behavior of materials under external forces.
- The concept of stress, strain, elasticity etc. as applied to various structures under loading are included.
- The student able to learn about concept of fluids, turbines and engines.

UNIT – I

STRESSES AND STRAINS: kinds of – stress-strains, elasticity and plasticity, Hooks law, stress –strain diagrams, modules of elasticity, Poisson's ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

UNIT – II

ENGINEERING MATERIALS AND JOINING PROCESSES (ENGINEERING MATERIALS): Types and applications of nonferrous metals and alloys

COMPOSITES: Introduction, Definition, Classification and applications (Air Craft and Automobiles)

SOLDERING, BRAZING AND WELDING: Definitions, Classification and method of soldering, Brazing a welding. Difference between Soldering, Brazing and Welding. Description of electric Arc Welding and Oxy-Acetylene Welding

UNIT – III

PROPERTIES OF FLUID : Stream line , streak line , path line , continuity equation pipes are in series, pipes are in parallel, HGL, TGL , Bernoullis equation .

HYDRAULIC PUMPS AND TURBINES: working principles and velocity diagrams.

UNIT – IV

INTERNAL COMBUSTION ENGINES: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT - V

BELTS - ROPES AND CHAIN: Belt And Rope Drives, Velocity Ratio, Slip, Length Of Belt , Open Belt And Cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

GEAR TRAINS: classification of gears, gear trains velocity ratio, simple, compound –reverted and epicyclic gear trains.

TEXT BOOKS:

1. Strength of Materials, R.K. Bansal, S.Chand Publications
2. Thermal Engineering, Ballaney, P.L., Khanna Publishers, 2003.
3. Theory of Machines, S.S. Rattan, Tata McGraw Hill.
4. Fluid Mechanics and Hydraulic Machinery R.K. Bansal.

REFERENCE BOOKS:

1. Thermal Engineering, R.K. Rajput, Laxmi Publications.
2. Theory of Machines, R.S. Khurmi, S. Chand Publications.
3. Fluid Mechanics and Hydraulic Machinery, Modi & Seth.
4. Manufacturing Technology, P.N.Rao.

COURSE OUTCOMES:

- The student would be exposed to basic mechanical engineering machinery.
- The student learned about mechanical components.
- Students understand about engines and turbines.

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II Year B.Tech EEE-I SEM **L T/P/D C**
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(R18A0494) ANALOG ELECTRONICS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICES (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   i. Multimeters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. P-N junction diode characteristics
2. Zener diode characteristics and Zener as voltage regulator
3. Half -Wave Rectifier with and without filter
4. Full - Wave Rectifier with and without filter
5. Input and output characteristics of transistor in CB configuration
6. Input and output characteristics of transistor in CE configuration
7. FET Characteristics
8. h-parameters of CE configuration
9. Frequency response of CE amplifier
10. Frequency response of CC amplifier
11. Frequency response of common source FET amplifier
12. UJT CHARACTERISITCS

PART C: Equipment required for Laboratories:

1. Regulated Power supplies (RPS)	0-30 V
2. CRO's	0-20 MHz
3. Function Generators	0-1 MHz
4. Multimeters	
5. Decade Resistance Boxes / Rheostats	
6. Decade Capacitance Boxes	
7. Ammeters (Analog or Digital)	0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA
8. Voltmeters (Analog or Digital)	0-50V, 0-100V, 0-250V
9. Electronic Components	Resistors, Capacitors, BJT's, LCD's, SCR's, UJTs, FET's,LED's, MOSFET's, Diodes- Ge & Si type, Transistors – NPN, PNP type

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. EEE-I SEM	**L**	**T/P/D**	**C**
	-	**- / 3 /-**	**1.5**

(R18A0393) ELEMENTS OF MECHANICAL ENGINEERING LAB

COURSE OBJECTIVES:

- To measure performance parameters of the systems such as Brake power, Efficiency,
- To understand the basic principles in the areas of internal combustion engines.
- To impart practical exposure on the performance evaluation of hydraulicturbines and pumps.

Part-A

1. I.C. Engine Valve / Port Timing Diagram.
2. I.C. Engine Performance Test on 4 -Stroke Diesel Engine.
3. Determination of FHP By Retardation and Motoring Test on I.C Engine
4. I.C. Engine Heat Balance Test on Petrol / Diesel Engine.
5. Study of Boilers.
6. I.C. Engine Performance Test on 2-Stroke Petrol Engine.

Part-B

1. Impact of Jet on Vanes
2. Performance Test on Pelton Wheel Turbine.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Reciprocating Pump.

Note: Total 10 experiments are to be conducted.

COURSE OUTCOMES:

- Analyze the performance characteristics of an internal combustion engines.
- Analyze the air compressor characteristics.
- To provide the students' knowledge in calculating performance analysis in turbines, pumps and can be used in power plants.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-I SEM	**L**	**T/P/D**	**C**
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(MANDATORY COURSE – II)
(R18A0004) FOREIGN LANGUAGE-FRENCH

COURSE OBJECTIVES:

- To inculcate the basic knowledge of the French language.
- To hone the basic sentence constructions in day to day expressions for communication in their vocation.
- To culminate their major with evidence of a purposeful education.

UNIT - I:
Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people
Writing: Understand and fill out a form
Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative
Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:
Speaking: Talk about one’s family – description of a person - express his admirations and preferences - express possession - express negation
Writing: Write and understand a short message
Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives Qualifying adjectives
Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III
Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency
Writing: A letter to a friend
Grammar: The expression of time – The –ir verbs in the present - The verbs do, go, take, come,- Adverbs – Reflexive verbs
Vocabulary: The days and months of the year- The sports –Hobbies

UNIT - IV
Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops
Writing: A dialogue between a vendor and a customer at the market
Grammar: Verbs “to want”, “to can” - Express capacity / possibility - Express will / desire – the future tense
Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

TEXT BOOKS*:*

1. Apprenons le Français 1& 2, New Saraswati House,2015
2. A propos, A1, Langers International,2010
3. Easy French Step-by-step by Myrna BellRochester

REFERENCE BOOKS:

1. Ultimate French Beginner-Intermediate (Coursebook) By LividLanguage
2. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C.Cummings.

COURSE OUTCOMES*:*

- The students will be able to communicate in French at A1level.
- The student will have an advantage in the competitive job market.
- This course benefits the graduates when pursuing study *opportunities* inthe countries where French is the official language.

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II Year B.Tech EEE-II SEM	**L**	**T/P/D**	**C**
	3	**1/-/-**	**3**

(R18A0203) ELECTRICAL MACHINES – II

COURSE OBJECTIVES:

To Understand:

- The working principle, constructional details, operational features &characteristics of single phase and three phase transformers.
- Testing of Single Phase Transformer and Three phase transformer.
- working principle, constructional details, operational features &characteristics of three phase induction motors
- Methods of Starting and speed control of Three phase induction motors

UNIT-I

SINGLE PHASE TRANSFORMERS: Single phase transformers - types - equivalent circuit – operation on no load and on load- phasor diagrams –losses- minimization of hysteresis and eddy current losses-efficiency-all day efficiency-regulation-effect of variations of frequency and supply voltage on iron losses.

UNIT-II

TESTING OF SINGLE PHASE TRANSFORMER AND AUTOTRANSFORMER: OC and SC tests – Sumpner's test – predetermination of efficiency and regulation - separation of losses test-parallel operation with equal and unequal voltage ratios – auto transformers- equivalent circuit – comparison with two winding transformers.

UNIT-III

POLYPHASE TRANSFORMERS: Poly phase transformers – Polyphase connections – Y/Y, Y/D, D/Y, D/D and open D, Third harmonics in phase voltages-three winding transformers-tertiary windings-determination of Zp, Zs and Zt transients in switching – off load and on load tap changing; Scott connection.

UNIT-IV

POLYPHASE INDUCTION MOTORS: Polyphase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field – principle of operation – rotor emf and rotor frequency – rotor reactance, rotor current and Power factor at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation – expressions for maximum torque and starting torque – torque slip characteristic – double cage and deep bar rotors – equivalent circuit – phasor diagram – crawling and cogging

UNIT-V

CIRCLE DIAGRAM OF INDUCTION MOTORS& SPEED CONTROL METHODS: Circle diagram-no load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations. Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection. Injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

TEXTBOOKS:

1. Electric machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies,
2. Electrical machines-PS Bhimbra, Khanna Publishers.
3. Electric Machines, I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill Publishers.

REFERENCEBOOKS:

1. Performance and D e s ig n of AC Machines by MG.Say, BPB Publishers.
2. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
3. Electromechanics-II (transformers and induction motors) S. Kamakashaiah Hitech publishers.

Textbook of Electrical Technology: volume 2 AC & DC Machines by B.L.THERAJA, A.K.THERAJA.

COURSE OUTCOMES:

At the end of this course the student would get

- Knowledge on the Constructional features of Transformers and Induction motors
- Full understanding of the basic principle of operation of these machines
- Clear understanding of Operational characteristics and speed control methods of Induction motors.
- Testing of different types of Transformers and Induction motors
- Calculate motor currents, power, speed and torque using an equivalent circuit model.
- Measure and calculate motor losses and efficiency.

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II Year B.Tech EEE-II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0207) POWER SYSTEMS - I

COURSE OBJECTIVES:

- To introduce and describe the various methods of power generation likehydro, thermal and nuclear generating stations.
- To study and understand the various parameters concerning the designinstallation and operation of A.C. Transmission lines
- To illustrate the economic aspects of power generation and tariff methods.

UNIT-I

THERMALPOWERSTATION: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gases. Brief description of TPS components- Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and cooling towers

NUCLEARPOWER STATION: Nuclear Fission and Chain reaction- Nuclear fuels – Principle of operation of nuclear reactor –Reactor Components: Moderators, Control rods, Reflectors and Coolants – Radiation hazards: Shielding and Safety precautions – Types of Nuclear reactors and brief description of PWR, BWR and FBR.

UNIT-II

HYDROELECTRIC POWERSTATIONS: Elements of hydroelectric power station – types - concept of pumped storage plants - storage requirements, mass curve and estimation of power developed from a given catchment area, heads and efficiencies.

UNIT III:

TRANSMISSION LINE PARAMETERS: Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

UNIT IV:

PERFORMANCE OF SHORT, MEDIUM AND LONG TRANSMISSION LINES: Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems. Long Transmission Line - Rigorous Solution, evaluation of A, B, C, D Constants.

UNIT-V:

FACTORS GOVERNING THE PERFORMANCE OF TRANSMISSION LINES: Skin and Proximity effects - Description and effect on Resistance of Solid Conductors - Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line - Surge Impedance and SIL of Long Lines - Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

TEXTBOOKS:

1. "C. L. Wadhawa", "Generation and utilization of Electrical Energy", New age International (P)Limited, Publishers 1997.
2. "C.L.Wadhawa","ElectricalPowerSystems",NewageInternational(P)Limited,Publishers1997.
3. "M.L.Soni,P.V.Gupta,U.S.BhatnagarandA.Chakraborti","ATextBookonPowerSystem Engineering", Dhanpat Rai and Co.Pvt.Ltd, 1999.

REFERENCE BOOKS:

1. "M.V. Deshpande", "Elements of Power Station design and practice",WheelerPublishing,3rd Edition1999.
2. "S.N.Singh","ElectricalPowerGeneration,TransmissionandDistribution",PHI,2003.
3. "V.KMehtaandRohitMehta","PrinciplesofPowerSystems",S.Chand&CompanyLtd,NewDelhi, 2004.

COURSE OUTCOMES:

At the end of this course the student would

- Get Basic understanding of different types power generation stations
- Be able to draw the layout of different types of power plants like hydropowerplant,thermalpowerstation,Nuclearpowerplantandgaspowerplant
- Get a clear understanding of different transmission line parameters, installation and their performance details.
- Understand the various economic aspects of the power plant erection, operation and different tariff methods
- Evaluate voltage drop and line loss calculations and design the capacitors and voltage regulating equipment to improve the power factor and voltage profile

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II Year B.Tech EEE-II SEM

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(R18A0209) CONTROL SYSTEMS

COURSE OBJECTIVES:

The main objectives of the course are:

- Introduce the principles and applications of linear control systems and Laplace transform.
- The basic concepts of block diagram reduction, transfer function representation, time response and time domain analysis, solutions to linear time invariant systems.
- Study and analyze the different methods of stability analysis.

UNIT - I:

INTRODUCTION: Concept of control system, Classification of control systems - Open loop and closed loop control systems, Differences, Examples of control systems- Effects of feedback, Feed Back Characteristics.

TRANSFER FUNCTION REPRESENTATION: Block diagram algebra, determining the Transfer function from block diagrams, Representation by Signal flow graphs - Reduction using Mason's gain formula – Transfer function SFG's.

UNIT - II:

TIME RESPONSE ANALYSIS: Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response, Steady state errors and error constants. PID controllers, Effects of proportional derivative, proportional integral systems on steady state error.

UNIT - III:

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability – Routh-Hurwitz's stability criterion – qualitative stability and conditional stability – Limitations of Routh-Hurwitz's stability.

ROOT LOCUS TECHNIQUE: Concept of root locus - Construction of root locus.

UNIT - IV:

FREQUENCY RESPONSE ANALYSIS: Introduction, Frequency domain specifications, Bode plot diagrams-Determination of Phase margin and Gain margin, Stability analysis from Bode plots. Polar plots.

UNIT - V:

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state, state variables and state model, Derivation of state models from block diagrams, Diagonalization, Solving the time invariant state equations, State Transition Matrix and its properties, Concepts of Controllability and Observability.

TEXT BOOKS:

1. Control Systems Engineering -I.J.Nagrath and M.Gopal, New Age International (P) Limited, Publishers.
2. Control Systems - A. Anand Kumar, PHI.
3. Control Systems Engineering by A. Nagoor Kani, RBA Publications.

REFERRENCE BOOKS:

1. Control Systems Theory and Applications - S. K. Bhattacharya, Pearson.
2. Control Systems Engineering - S. Palani, TMH.
3. Control Systems - N. K. Sinha, New Age International (P) Limited Publishers.
4. Control Systems by S.Hasan Saeed, KATSONBOOKS.
5. Solutions and Problems of Control Systems by A.K. Jairath, CBS Publishers.

COURSE OUTCOMES:

After going through this course the student gets

- A thorough knowledge on open loop and closed loop control systems, concept of feedback in controlsystems.
- Understanding of transfer function representation through block diagram algebra and signal flowgraphs.
- Time response analysis of different order systems through their characteristic equation.
- Time domain specifications, stability analysis of control systems in s-domain through-H criteria.
- Root locus techniques, frequency response analysis through Bode diagrams and Polar plots.

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II Year B.Tech. EEE-I SEM	**L**	**T/P/D**	**C**
	3	**-/ - /-**	**3**

(R18A0404) SWITCHING THEORY AND LOGIC DESIGN

COURSE OBJECTIVES:

This course provides in-depth knowledge of switching theory and the logic design techniques of digital circuits, which is the basis for design of any digital circuit. The course objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

UNIT -I

NUMBER SYSTEM AND BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes, Hamming Code.

BOOLEAN ALGEBRA: Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates. Multilevel NAND/NOR realizations.

UNIT -II

MINIMIZATION AND DESIGN OF COMBINATIONAL CIRCUITS: K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Prime and Essential prime Implications, Quine Mc Cluskey Tabular Method, Combinational Design, Arithmetic Circuits, Comparator, decoder, Encoder, Multiplexers, DeMultiplexers, Code Converters.

UNIT -III

SEQUENTIAL MACHINES FUNDAMENTALS: Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip-Flop, The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration.

UNIT -IV

SEQUENTIAL CIRCUIT DESIGN AND ANALYSIS: Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops Counters - Design of Ripple Counter, Synchronous counter, Ring Counter, Registers, Shift Register**.**

UNIT -V

SEQUENTIAL CIRCUITS: Finite state machine- capabilities and limitations, Mealy and Moore models, minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods -Merger Graphs & Merger Tables.

TEXT BOOKS:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Switching Theory and Logic Design – Bhanu Bhaskara –Tata McGraw Hill Publication, 2012
4. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
5. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006. 6. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

COURSE OUTCOMES:

Upon completion of the course, student should possess the following skills:

- Be able to manipulate numeric information in different forms
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyze small combinational circuits and to use standard combinational functions to build larger more complex circuits.
- Be able to design and analyze small sequential circuits and to use standard sequential functions to build larger more complex circuits.

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II Year B.Tech EEE-II SEM

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(R18A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyze the financial formats of the organization for smooth running of the business.

UNIT-I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

DEMAND ANALYSIS: Demand Determinants, Law of Demand and exceptions.

ELASTICITY OFDEMAND: Definition, Types, Measurement and Significance of elasticity of Demand.

DEMAND FORECASTING: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgmental Approach, and Time Series Analysis).

UNIT-II

PRODUCTION & COST ANALYSIS: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

COST ANALYSIS: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT-III

MARKETS: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

PRICING: Objectives, Methods of Pricing;

BUSINESS: Features of different forms of Business Organization (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

UNIT-IV

INTRODUCTION TO CAPITAL AND FINANCIAL ACCOUNTING: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

ACCOUNTING: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT-V

INVESTMENT DECISION: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

FINANCIAL ANALYSIS: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

TEXTBOOKS:

1. Varsheney & Maheswari, Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad2013
3. M. Kasi Reddy & Sarawathi, Managerial Economics and Financial Analysis, PHI, New Delhi, 2010.

REFERENCE BOOKS:

1. Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4. P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5. S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
6. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

COURSE OUTCOMES:

Students should be able

- To understand the basic economic principles, forecast demand and supply.
- Should be able to estimate cost and understand market structure, pricing practices.
- Able to interpret the financial results of the organisation.

OPEN ELECTIVE - I

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	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)
(R18A0451) DIGITAL ELECTRONICS

COURSE OBJECTIVES:
The main objectives of the course are:

- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
- To introduce the methods for simplifying Boolean expressions.
- To outline the formal procedures for the analysis and design of combinational and sequential circuits.
- To introduce the concept of memories and programmable logic devices.
- To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I
BINARY SYSTEMS AND LOGIC GATES: Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems, AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II
MINIMIZATION TECHNIQUES: Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III
COMBINATIONAL CIRCUITS: Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV
SEQUENTIAL CIRCUITS: Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V
MEMORY DEVICES: Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

TEXT BOOKS:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCE BOOKS:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

COURSE OUTCOMES

After the completion of the course, the student will be able to:

- Analyze different methods used for simplification of Boolean expressions
- Design and implement Combinational and Sequential circuits.
- Design and implement Synchronous and Asynchronous Sequential Circuits

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II Year B.Tech II SEM	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)
(R18A0551) DATABASE SYSTEMS

COURSE OBJECTIVES:

- To understand the basic concepts and the applications of database systems
- To Master the basics of SQL and construct queries using SQL
- To understand the relational database design principles
- To become familiar with the basic issues of transaction processing and concurrency control
- To become familiar with database storage structures and access techniques

UNIT I:

INTRODUCTION TO DATABASE: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II:

DATABASE DESIGN (ER MODEL): Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys - primary key, super key, candidate keys. Introduction to relational model -Tabular, Representation of Various ER Schemas.ER Diagram Notations - Goals of ER Diagram - Weak Entity Set- Views.

UNIT III:

STRUCTURED QUERY LANGUAGE: SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.

UNIT IV

DEPENDENCIES AND NORMAL FORMS: Importance of a good schema design, Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

UNIT V

TRANSACTIONS: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition, 2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCE BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management System",McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,"Fundamentals of Database System," Addison -Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, "An Introduction to Database", Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning, 2009.

COURSE OUTCOMES:

- Demonstrate the basic elements of a relational database management system
- Ability to identify the data models for relevant problems
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

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II Year B.Tech. II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE I)

(R18A0553) DATA STRUCTURES USING PYTHON

COURSE OBJECTIVES*:*

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I

INTRODUCTION TO PYTHON: Installation and Working with Python, Understanding Python variables Python basic Operators, Understanding python blocks, Python Data Types: Declaring and using Numeric data types: int, float, complex, Using string data type and string operations.

UNIT II

CONTROL FLOW: if, if-elif-else, loops ,For loop using ranges, string ,Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block, Python arrays.

UNIT III

FUNCTIONS: -Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lamda function in python.

UNIT IV

DATA STRUCTURES: List Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions, Dictionary manipulation, list and dictionary in build functions

UNIT V

SORTING: Bubble Sort, Selection Sort, Insertion Sort, Merge sort, Quick sort. Linked Lists, Stacks, Queues

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
2. R. Nageswara Rao, “Core Python Programming”, dream tech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples and dictionaries.
- Read and write data from/to files in Python Programs

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. Tech II Year II SEM

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3	-/-/-	3

(OPEN ELECTIVE – I)
(R18A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

- To create an understanding on Intellectual Properties and the importance of it.
- To acquire knowledge on Trademarks, Trade secrets & unfair completion methods.
- To create awareness on the protection of copyrights and patents.
- To attain basic understanding of Cyber laws, Cyber Crime and get an understanding of Privacy of Data.
- To gain knowledge on international aspects and the Emerging Trends in IPR.

UNIT - I:

INTRODUCTION: Introduction to Intellectual property, types of intellectual property, importance of intellectual property rights, agencies Responsible for Intellectual property Registration, Regulatory – Compliance and Liability Issues.

UNIT - II:

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, Transfer of Rights, protectable matter, selecting and evaluating trade mark, Registrations of Trade Marks, Claims.

TRADE SECRETS: Determination of trade secret status, liability for misappropriations of trade secrets, protection for submission.

UNFAIR COMPETITION- Misappropriation right of publicity, false advertising

UNIT - III:

COPY RIGHTS: Fundamental of copy right, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, notice of copyright.

PATENTS: introduction, patent searching process, ownership rights and transfer.

UNIT - IV:

CYBER LAW: Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

UNIT - V:

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: Emerging trends in trade mark; copy rights, patent, International overview on intellectual property.

TEXT BOOKS:

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning.
2. Cyber Law. Text & Cases, South-Western's Special Topics collections.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi
4. A short course in International Intellectual Property Rights – Karla C. Shippey,World Trade Press – 2nd Edition.

REFERENCE BOOKS

1. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
2. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
3. Intellectual Property Rights: C B Raju: ISBN-8183870341

COURSE OUTCOMES:

Student will be able to:

- Prepare and protect the Inventions, startup ideas and rights of patents and copy rights etc.,
- Gain knowledge on Trademarks and Trade Secrets.
- Brings awareness on the various types of Unfair Competition and gets well versed with exposure to licensing and transfer of Copyrights and Patents
- Attain awareness of Cyber laws and Cyber Crime, to protect the data from Cybercrime.
- Comprehend emerging trends in IPR globally.

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II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)
(R18A0352) GREEN ENERGY SYSTEMS

COURSE OBJECTIVES:

- The course aims to highlight the significance of alternative sources of energy.
- Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.

UNIT-I

INTRODUCTION TO SOLAR RADIATION: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics.

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

OCEAN ENERGY: OTEC, Principles of utilization, setting of OTEC plants, thermo dynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

ENERGY EFFICIENT SYSTEMS: (A) ELECTRICAL SYSTEMS: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

(B) MECHANICAL SYSTEMS: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

ENERGY EFFICIENT PROCESSES: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

GREEN BUILDINGS: Definition features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCE BOOKS:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy

COURSE OUTCOMES:

- The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
- Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.

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II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(OPEN ELECTIVE – I)
(R18A0555) DATA VISUALIZATION

COURSE OBJECTIVES:

- To learn different statistical methods for Data visualization.
- To understand the basics of R and Python.
- To learn usage of Watson studio.
- To understand the usage of the packages like Numpy, pandas and matplotlib.
- To know the functionalities and usages of Seaborn.

UNIT I

Introduction to Statistics : Introduction to Statistics, Difference between inferential statistics and descriptive statistics, Inferential Statistics- Drawing Inferences from Data, Random Variables, Normal Probability Distribution, Sampling, Sample Statistics and Sampling Distributions.

R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

UNIT II

Data manipulation with R: Data manipulation packages-dplyr,data.table, reshape2, tidyr, Lubridate, Data visualization with R.

Data visualization in Watson Studio: Adding data to datarefinery, Visualization of Data on WatsonStudio.

UNIT III

Python: Introduction to Python, How to Install, Introduction to Jupyter Notebook, Python scriptingbasics, Numpy and Pandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and datetime columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools in Python- Introduction to Matplotlib, Basic plots usingmatplotlib, Specialized Visualization Tools usingMatplotlib, Advanced Visualization Tools usingMatplotlib- WaffleCharts, WordClouds.

UNIT V

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition, R. Nageswara Rao, Dreamtech Press.
2. Hands on programming with R by Garrett Grolemund, Shroff/O'Reilly; First edition
3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress
2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc. \
3. The Comprehensive R Archive Network- https://cran.r-project.org
4. https://seaborn.pydata.org/
5. https://dataplatform.cloud.ibm.com/

COURSE OUTCOMES:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization.
- Gain knowledge on R and Python
- Understand usage of various packages in R and Python.
- Demonstrate knowledge of Watson studio.
- Apply data visualization tools on various data sets.

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(R18A0282) ELECTRICAL MACHINES LAB – I

COURSE OBJECTIVES:

- ToexposethestudentstotheoperationofDCGeneratortoexposethestudents to the operation of DC Motor.
- To examine the self-excitation in DC generators.

The following experiments are required to be conducted compulsory experiments:

1. Load test on DC shunt generator. Determination of characteristics.
2. Load test on DC series generator. Determination of characteristics.
3. Load test on DC compound generator. Determination of characteristics.
4. Determination of critical resistance and critical speed of D.C. shunt generator
5. Hopkinson's test on DC shunt machine. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Speed control of DC shunt motor
8. Brake test on DC compound motor. Determination of performance curves.
9. Retardation test on DC shunt motor. Determination of losses at rated speed.
10. Separation of losses in DC shunt motor

COURSE OUTCOMES:

After successfully studying this course, students will:

- Be able to systematically obtain the equations that characterize the performance of
- An electric circuit as well as solving both single phase and DC Machines.
- Acknowledge the principles of operation and the main features of electric machines and their applications.
- Acquire skills in using electrical measuring devices.

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(R18A0284) ELECTRICAL CIRCUITS AND SIMULATION LAB

COURSE OBJECTIVES:

- To design electrical systems.
- To analyze a given network by applying various Network Theorems.
- To measure three phase Active and Reactive power.
- To understand the locus diagrams

PART A

1) Millmann's Theorem
2) Locus Diagrams of RL and RC Series Circuits
3) Series and Parallel Resonance
4) Z and Y Parameters
5) Transmission(ABCD) and Hybrid parameters
6) Measurement of Active Power for Star and Delta connected balanced loads
7) Measurement of Reactive Power for Star and Delta connected balanced loads

PART-B

PSPICE SIMULATION

1) Simulation of DC Circuits
2) DC Transient response
3) Mesh Analysis
4) Nodal Analysis

Note: Conduct any 6 Experiments from PART- A & PART- B is Mandatory

COURSE OUTCOMES:

After successfully studying this course, students will:

- Design electrical systems.
- Analyze a given network by applying various Network Theorems.
- Measure three phase Active and Reactive power.

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MANDATORY COURSE – III
(R18A0014) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES

We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around us. We are not anentity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects this ethos. There is a direct application of this wisdom even in modern times. Idea of an activity based course on environment protection is to sensitize the students on the above issues through following two types of activities.

UNIT – I

ENVIRONMENTAL EDUCATION AND ECOSYSTEMS: Environmental education: Definition and objective. Origin of Environmental sciences from Vedas, Structure and function of an ecosystem, Food chain and Food Web, Ecological Pyramids,Bioaccumulation and Biomagnification.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on importance of Environmental Education

UNIT – II

NATURAL RESOURCES: Introduction - definition, Forest resources- Uses, Causes and consequences of deforestation, Water resources-Sources and Uses of Water, Benefits and problems of DAMs, Energyresources-Renewable and Non-renewable energy resources.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Natural Resources

UNIT III

ENVIRONMENTAL POLLUTION: Environmental segments – structure and composition of atmosphere. Pollution – Sources, effects and control of Air, water. Climate change - ozone layer depletion, Global warming / greenhouse effect.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Environmental pollution.

UNIT IV

WASTE MANAGEMENT: Solid waste management: sources, effects and control of municipal waste, bio medical waste – waste management and E-waste.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Cleanliness, segregation of waste and Swacha-Bharath.

UNIT V

SOCIAL ISSUES AND THE ENVIRONMENT: Concept, threats and strategies of sustainable development, Water conservation-rain water harvesting, Energy conservation, Green activities. *Activity: Poster making/Seminar/ Slogans making/ Group discussion on Social Issues and the Environment.

TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New ageinternational Publishers.
2. Text book of Environmental Science and Technology – Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela.2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham & Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

COURSE OUTCOMES:

After successfully studying this course, students will:

- Understand & evaluate technologies on the basis of Ecological principles and environmental regulations
- Develop environmental regulations which in turn help in sustainable development.
- Understand the complex relationships between natural and human systems.

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(R18A0208) POWER SYSTEMS - II

COURSE OBJECTIVES:

- To design the insulators for overhead lines
- Understand the construction and grading of cables in power transmission.
- To examine A.C. and D.C distribution systems and grounding techniques.
- To examine the sag of transmission lines.

UNIT-I

OVERHEAD LINE INSULATORS, SAG AND TENSION CALCULATIONS: Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - Voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

UNIT-II

UNDERGROUND CABLES: Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Intersheath grading

UNIT-III

D.C. DISTRIBUTION SYSTEMS: Classification of Distribution Systems – Comparison of DC vs. AC and Underground vs. Overhead Distribution Systems - Requirements and Design features of Distribution Systems. Voltage Drop Calculations in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

UNIT– IV

A.C. DISTRIBUTION SYSTEM: Voltage Drop Calculations in A.C. distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages – Energy losses in distribution system. System Grounding and methods of Neutral Grounding: Solid, Resistance, Reactance - Arcing Grounds.

UNIT-V

SUBSTATIONS & BUS BAR: Classification of substations – Air insulated substations – Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements: single bus bar, sectionalized single bus bar, double bus bar, main and transfer bus bar system with relevant diagrams.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L. Soni, P.V. Gupta, U.S. Bhatnagar,
2. Electrical power systems - by C.L Wadhwa, New Age International (P) Limited, Publishers, 1998.

3. "C. L. Wadhwa", "Generation and utilization of Electrical Energy", New age International (P) Limited, Publishers 1997.

REFERENCE BOOKS:

1. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies, 4th edition.
2. Power System Analysis and Design by B.R. Gupta, Wheeler Publishing
3. Power System Analysis by Hadi Sadat – TMH Edition.

COURSE OUTCOMES:

- Understand A.C. and D.C. distribution systems.
- Able to analyze the performance of distribution lines
- Able to analyze the performance of Sag and Tension Calculations
- Able to understand overhead line insulators and underground cables.
- Able to understand between air insulated substations.

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(R18A0204) ELECTRICAL MACHINES – III

COURSE OBJECTIVES:

- To understand the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities.
- To get knowledge on different types of single phase motors and stepper motors which are having significant applications in house hold appliances, industrial applications and control systems.

UNIT - I:

SYNCHRONOUS MACHINE & CHARACTERISTICS: Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation. Armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics.

UNIT - II:

REGULATION OF SYNCHRONOUS GENERATOR: Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT - III:

PARALLEL OPERATION OF SYNCHRONOUS GENERATOR: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input.

UNIT - IV:

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. Hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT - V:

SINGLE PHASE MOTORS & SPECIAL MACHINES: Single phase Motors: Single phase induction motor – Constructional features-Double revolving field theory Equivalent circuit - split-phase motors - Capacitor start Capacitor run motors. Principles of A.C. Series motor-Universal motor, Stepper motor, shaded pole motor **(QUALITATIVE TREATMENT ONLY).**

TEXT BOOKS:

1. Electrical Machines – by P.S. Bimbra, Khanna Publishers.
2. Electrical Machines(Ac & Dc machines), by J B GUPTA, S K kataria and sons
3. Electric Machines, I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill Publishers.

REFERENCE BOOKS:

1. Electro mechanics - III (Synchronous and single phase machines), S. Kamakashiah, Right Publishers.
2. Performance and Design of AC Machines, MG. Say, BPB Publishers.
3. Theory of Alternating Current Machinery, Langsdorf, Tata McGraw-Hill Companies.
4. Electric machinery, A.E. Fitzerald, C. Kingsley and S. Umans, Mc Graw Hill Companies.

COURSE OUTCOMES:

After this course the student gets a thorough knowledge on:

- Construction, operation, characteristics, regulation, parallel-operation, starting& speed control methods of synchronous machines.
- Construction, operation and characteristics of single-phase motors & special machines.
- Ability to apply the above concepts to real-world electrical problems and applications.

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(R18A0210) POWER ELECTRONICS

COURSE OBJECTIVES:

- To get an understanding of semiconductor devices and systems which have a large application in the power generation, transmission, distribution and utilization.
- To get an in depth understanding of the basic concepts of different types of power semiconductor devices and their applications in converters, inverters, choppers, cycloconverter, dual converters, etc.

UNIT - I

POWER SEMI CONDUCTOR DEVICES & COMMUTATION CIRCUITS: Thyristors – Silicon Controlled Rectifiers (SCR's) - Two transistor analogy - Static and Dynamic characteristics - Turn on and turn off methods - Series and parallel connections of SCR's – Snubber circuit details – Line Commutation and Forced Commutation circuits – Power MOSFET, Power IGBT, their characteristics.

UNIT - II

AC - DC CONVERTERS (1-PHASE & 3-PHASE CONTROLLED RECTIFIERS): Phase control technique – Single phase Line commutated converters –Bridge connections – Half controlled converters with R, RL loads – Derivation of average load voltage and current – Numerical problems. Fully controlled converters, Bridge connections with R, RL loads – Derivation of average load voltage and current. Three phase converters – Three pulse and six pulse converters – Bridge connections average load voltage with R and RL loads – Effect of Source inductance – Single phase Dual converters.

UNIT - III

DC - DC CONVERTERS (CHOPPERS):

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL loads- Step up Chopper – load voltage expression, DC Jones Chopper.

UNIT - IV

AC - AC CONVERTERS (AC VOLTAGE CONTROLLERS) & FREQUENCY CHANGERS (CYCLO-CONVERTERS): AC voltage controllers with R and RL loads – Derivation of RMS load voltage, current and power factor wave forms - Cycloconverter - Types in bridge configuration with R and RL loads

UNIT - V

DC - AC CONVERTERS (INVERTERS): Basics of Inverters – Single phase inverter – Basic series inverter - operation and waveforms - Three phase inverters (120, 180 degrees conduction modes of operation) - Voltage control techniques for inverters, Pulse width modulation techniques.

TEXT BOOKS:

1. Power Electronics, Dr. P. S. Bimbhra, Khanna Publishers
2. Power Electronics, M. D. Singh & K. B. Kanchandhani, Tata Mc Graw - Hill Publishing Company.

REFERENCE BOOKS:

1. Power Electronics; Circuits, Devices and Applications, M. H. Rashid, Prentice Hall of India.
2. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
3. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
4. Power Electronics, P. C. Sen, Tata Mc Graw-Hill Publishing.

COURSE OUTCOMES:

At the end of the course the students get:

- A thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power semiconductor devices, thyristors nature of the R, RL and RLE loads for different power inputs.
- AC-to-DC power conversion through 1-phase & 3-phase controlled rectifiers, DC-to-DC power conversion through step-up and step-down choppers.
- Different types of PWM (pulse-width modulation) techniques, steady-state and transient state analysis of all the power converters, which can be to applied to concepts of real-world electrical and electronics problems & applications.

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(R18A0410) LINEAR & DIGITAL IC

COURSE OBJECTIVES:

The main objectives of the course are:

- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To teach the theory of ADC and DAC.
- To introduce the concepts of waveform generation and introduce some special function ICs.

UNIT - I:

OPERATIONAL AMPLIFIER: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II:

OP-AMP, IC-555 & IC 565 APPLICATIONS: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators - Triangular, Sawtooth, Square wave, IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT - III:

DATA CONVERTERS: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV:

DIGITAL INTEGRATED CIRCUITS: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing. TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT - V:

SEQUENTIAL LOGIC IC'S AND MEMORIES: Familiarity with commonly available 74XX & CMOS 40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Communication Systems - Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2004.

REFERENCES BOOKS:

1. Electronic Communications - Dennis Roddy and John Coolean, 4th Edition, PEA, 2004.
2. Electronic Communication Systems - Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication - K. Sam Shanmugam, Wiley, 2005.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. Principles of Communication Systems - H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

- Conceptually understand the baseband signal & system.
- Identify various elements, processes, and parameters in telecommunications systems, and describe their functions, effects, and interrelationship.
- Design procedure of AM Transmission & Reception, analyze, measure, and evaluate the performance of a telecommunication system against given criteria.
- Understand basic knowledge of FM Transmission & Reception.
- Understand various types of SSB Transmission & reception.

PROFESSIONAL ELECTIVE - I

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(PROFESSIONAL ELECTIVE – I)

(R18A1205) ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES:

To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning

Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non-monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice-Hall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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(PROFESSIONAL ELECTIVE – I)
(R18A0211) HIGH VOLTAGE ENGINEERING

COURSE OBJECTIVES:
To understand:
- The detailed analysis of Breakdown in gaseous, liquids and solid dielectrics.
- Information about generation and measurement of High voltage and current.
- High voltage testing methods.

UNIT – I
INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT – II
BREAK DOWN IN GASEOUS, LIQUID DIELECTRICS AND SOLID DIELECTRICS: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT – III
GENERATION OF HIGH VOLTAGES AND CURRENTS: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.
MEASUREMENT OF HIGH VOLTAGES AND CURRENTS: Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT – IV
OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT – V
NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.
HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS: Testing of Insulators and bushings, testing

of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters and Radio Interference measurements.

TEXT BOOKS:

1. M. S. Naidu, V. Kamaraju (2009), High Voltage Engineering, 4th edition, Tata McGraw Hill Publications, New Delhi.
2. E. Kuffel, W. S. Zaengl, J. Kuffel (2000), High Voltage Engineering: Fundamentals, 2nd edition, Elsevier Publishers, New York, USA.

REFERENCE BOOKS:

1. C. L. Wadhwa (2007), High Voltage Engineering, New Age Internationals (P) Limited, New Delhi.
2. Ravindra Arora Wolfgang Mosch (2011), High Voltage Insulation Engineering, 1st edition, New Age International (P) Ltd., New Delhi.

COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

- Explain the techniques for high voltage generation
- Measure high voltage in power systems and describe the electrostatic fields and its control, design insulators for high voltage applications,
- Capable to perform non-destructive insulation test techniques
- Describe the over-voltages, testing procedures and insulation coordination, learn how to design and do testing of external insulation

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(PROFESSIONAL ELECTIVE – I)
(R18A0212) DIGITAL CONTROL SYSTEMS

COURSE OBJECTIVES:

To get

- Knowledge about principles and techniques of A/D and D/A conversions and basics of Z-transform
- Knowledge in stability analysis of digital control systems
- Knowledge about the design of digital control systems for different engineering model

UNIT – I

SAMPLING AND RECONSTRUCTION:

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

Z – TRANSFORMS:

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms-Plane analysis of discrete- time control system, Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between S-plane andZ-plane

UNIT –II

STATE SPACE ANALYSIS:

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it‘s Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

CONTROLLABILITY AND OBSERVABILITY:

Concepts of Controllability and Observability, Tests for controllability and observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – III

STABILITY ANALYSIS:

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips
– Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – IV:

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS:

Transient and steady – State response Analysis – Design based on the frequency response Method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag, Lead-Lag and Lag- Lead compensators and digital PID controllers.

UNIT – V

STATE FEEDBACK CONTROLLERS AND OBSERVERS:

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula. State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition.
2. Digital Control and State Variable Methods by M.Gopal, TMH.
3. Digital Control System Analysis and Design, 3rd Edition by Charles L.Phillips, G. Troy Nagle.

REFERENCE BOOKS:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering, M.Gopal New age international publishers.
3. Advanced Control Theory by NAGOOR KANI, 2nd Edition, and RBA Publications.
4. Digital Control Systems, Design, Identification and Implementation by Landau**,** Iona Dore, ZitoGianluca, Springer, 1stedition.
5. Digital control systems by R.Isermann, Springer, 1stedition.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to:

- Learn the basics and digital control system for the real time analysis
- Design of control systems.
- Learn comprehensive knowledge of concepts of stability analysis
- Understand the design of discrete time systems
- Understand the concepts of optimal control for discrete domain.

OPEN ELECTIVE II

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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OPEN ELECTIVE III

(R18A1251) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

- To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
- To learn how to plan for information systems &implementation
- To study about security aspects of information systems

UNIT-I

INTRODUCTION: MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage. Case Study: MIS at any business establishment.

UNIT-II

BUSINESS APPLICATIONS OF INFORMATION SYSTEMS: E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.
Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III

MANAGEMENT OF IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.
Effectiveness of MIS: A Case Study.

UNIT-IV

BUILDING OF INFORMATION SYSTEMS: System Development Stages, System Development Approaches. Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination. Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, and Design Methods. Detailed system design.

UNIT-V

INTRODUCTION TO CYBER CRIME: Cyber Crime Defination and orgin of the word, cybercrime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cybercrimes and indian ITA 2000, Global perspective on cybercrime-Cybercrime era. (Refer: Nina Godbole et al)

TEXT BOOKS:

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.
2) Nina Godbole & Sunit Belapure “Cyber Security” Wiley india 2012.

REFERENCE BOOKS:

1. Jawadekar, MIS Text and Cases, TMH, 2012.
2. Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
3. A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
4. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
5. Apache OFBiz for Ecommerce and ERP - https://ofbiz.apache.org/
6. Magneto for Ecommerce (B2B Commerce) - https://magento.com/
7. Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
8. Analytica – DSS - http://www.lumina.com
9. OpenRules – Business Rules and Decision Management system - http://openrules.com/

COURSE OUTCOMES:

- Ability to apply Concepts & applications of Management Information Systems.
- Ability to perform Information Systems Planning & Implementations.
- Ability to adapt Cybercrime and information security procedures.

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	3	**-/-/-**	**3**

(OPEN ELECTIVE II)

(R18A0552) INTRODUCTION TO JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able to:

- Create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
- Use data types, arrays and strings;
- Implement error-handling techniques using exception handling,
- Create and event-driven GUI using AWT components.

UNIT - I

OOP CONCEPTS: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.

JAVA BASICS: History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, Buffered Reader class, Scanner class, String Tokenizer class, inner class.

UNIT - II

INHERITANCE: Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

POLYMORPHISM – Dynamic binding, method overriding, abstract classes and methods.

INTERFACES- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

PACKAGES- Defining, creating and accessing a package, importing packages.

UNIT - III

EXCEPTION HANDLING: Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

MULTI THREADING: Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT - IV

APPLETS: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

EVENT HANDLING: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

UNIT - V

GUI PROGRAMMING WITH JAVA: AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT CONTROLS: Labels, button, text field, check box, and graphics.

LAYOUT MANAGER – Layout manager types: border, grid and flow.

SWING– Introduction, limitations of AWT, Swing vs. AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, UniversityPress.
3. 3.Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

COURSE OUTCOMES:

- An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs using a high level language;
- An appreciation of the principles of object oriented programming;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Be able to make use of members of classes found in the Java API.
- Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
- Able to develop applications using Applet, awt and GUI Programming.

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(OPEN ELECTIVE II)

(R18A01252) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Objectives of the course can be characterized as follows:

- Understanding the specific roles within a software organization as related to project and process management
- Understanding the basic infrastructure competences (e.g., process modeling and measurement)

UNIT-I

CONVENTIONAL SOFTWARE MANAGEMENT: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

CONVENTIONAL AND MODERN SOFTWARE MANAGEMENT: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases.

UNIT-III

ARTIFACTS OF THE PROCESS: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

FLOWS OF THE PROCESS: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V

PROJECT ORGANIZATIONS AND RESPONSIBILITIES: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, “Software Project Management”, 1998, PEA.
2. Henry, “Software Project Management”, Pearson.

REFERENCE BOOKS:

1. Richard H.Thayer.” Software Engineering Project Management”, 1997, IEEE Computer Society.
2. Shere K.D.: “Software Engineering and Management”, 1998, PHI.
3. S.A. Kelkar, “Software Project Management: A Concise Study”, PHI.
4. Hughes Cotterell, “Software Project Management”, 2e, TMH. 88 5. Kaeron Conway, “Software Project Management from Concept to D

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

- Describe and determine the purpose and importance of project managementfrom the perspectives of planning, tracking and completion of project
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resource withthe application of suitable project management tools

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	3	**-/-/-**	**3**

(OPEN ELECTIVE II)

(R18A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES:

- To know the basics of ERP
- To understand the key implementation of ERP
- To know the business modules of ERP
- To evaluate the current and future trends in ERP
-

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP) and Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.

2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice,Prentice Hall of India,2 nd edition, 2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

- To know the strategic importance of Enterprise Resource Planning
- To Understand and implement ERP in various Sectors.

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	3	**-/-/-**	**3**

(OPEN ELECTIVE - II)

(R15A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

- To learn about basis of Nano Materials.
- In this course we focus on synthetic aspects for the design of nanostructured materials.
- We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.
- The course will then focus on different type of nanostructures with a special emphasis on carbon nano tubes (CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of these nanostructures.

UNIT-I

GENERAL INTRODUCTION: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

SILICON CARBIDE: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles, nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano composites.

UNIT-II

MECHANICAL PROPERTIES: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

ELECTRICAL PROPERTIES: Switching glasses with nanoparticles, Electronic conduction with nano-particles.

OPTICAL PROPERTIES: Optical properties, special properties and the coloured glasses.

MAGNETIC PROPERTIES: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT–III

SYNTHESIS ROUTES: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV

TOOLS TO CHARACTERIZE NANO MATERIALS: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nano indentation

UNIT–V

APPLICATIONS OF NANO MATERIALS: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1. Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press-IIM.
2. Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
3. Guozhong Cao, Nanostructures and Nano-materials: Synthesis, Propertiesand Applications, Imperial College Press 2004.

REFERENCES BOOKS:

1. Nano: The Essentials by T. Pradeep, McGraw- Hill Education.
2. Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.
3. Transport in Nano structures- David Ferry, Cambridge University press 2000
4. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
5. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6. Electron Transport in Mesoscopic systems – S. Dutta, Cambridge University press.
7. Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

COURSE OUTCOMES:

- Will familiarize about the science of Nano Technology.
- Will demonstrate the preparation of Nano Technology.
- Will develop knowledge in characteristic Nano Technology & Nano Materials.

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III B.Tech EEE I SEM **L T/P/D C**

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(R18A0283) ELECTRICAL MACHINES LAB – II

COURSE OBJECTIVES:

- To understand the operation of synchronous machines.
- To understand the analysis of power angle curve of a synchronous machine**.**
- To understand the equivalent circuit of a single phase transformer and single phase induction motor.
- To understand the circle diagram of an induction motor by conducting a blocked rotor test.

PART-A

The following experiments are required to be conducted as compulsory experiments

1. Sumpner's test on a pair of single phase transformers
2. No-load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance method
4. Regulation of a three –phase alternator by MMF method
5. V and Inverted V curves of a three—phase synchronous motor.
6. Equivalent Circuit of a single phase induction motor
7. Determination of Xd and Xq of a salient pole synchronous machine
8. Load test on three phase Induction Motor

PART-B

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list

9. Regulation of three-phase alternator by Z.P.F.
10. Measurement of sequence impedance of a three-phase alternator.
11. Scott Connection of transformer
12. Efficiency of 3 phase alternator.

COURSE OUTCOMES:

After the completion of this laboratory course, the student will be able to

- Understand the performance of different machines using different testing methods to convert from three phase to two phase and vice versa.
- Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods.
- Control the active and reactive power flows in synchronous machines Start different machines and control the speed and power factor.

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(R18A0285) CONTROL SYSTEMS AND SIMULATION LAB

COURSE OBJECTIVES:

- To understand the different ways of system representations such as transfer function representation and state space representations and to assess the system dynamicresponse.
- To assess the system performance using time domain analysis and methods for improving it.
- To assess the system performance using frequency domain analysis and techniques for improving the performance to design various controllers and compensators to improve system performance.

PART-A

The following experiments are required to be conducted compulsory experiments:

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, Simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Transfer function of DC generator
7. Temperature controller using PID
8. Characteristics of AC servo motor

PART-B

In addition to the above eight experiments, at least any two of the experiments from the Following list are required to be conducted

9. Effect of P, PD, PI, PID Controller on a second order systems
10. Lag and lead compensation – Magnitude and phase plot
11. a) Simulation of P, PI, PID Controller.
    b) Linear system analysis (Time domain analysis, Error analysis) using suitable software
12. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using Suitable software
13. State space model for classical transfer function using suitable software -Verification.
14. Design of Lead-Lag compensator for the given system and with specification using Suitable software

COURSE OUTCOMES:

After completion of this lab the student is able to

- Improve the system performance by selecting a suitable controller and/or a compensator for a specific application.

- Apply various time domain and frequency domain techniques to assess the system Performance.
- Apply various control strategies to different applications (example: Power systems, electrical drives etc)
- Test system controllability and observability using state space representation and applications of state space representation to various systems.

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III B.Tech EEE I SEM

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(MANDATORY COURSE)

(R18A0006) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

COURSE OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

UNIT –I

PERSONAL EVALUATION: Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT -II

PROFESSIONAL COMMUNICATION: Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT – III

CAREER PLANNING: Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT – IV

TECHNICAL WRITING: Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT – V

ETHICS AND RESPONSIBILITIES: Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCE BOOKS:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies.

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(R18A0213) ELECTRICAL MEASUREMENTS & INSTRUMENTATION

COURSE OBJECTIVES:

- To introduce the basic principles of all Electrical measuring instruments
- To deal with the measurement of voltage, current, Power factor, power, energy, etc.
- To understand the basic principle of Transducers.

UNIT–I

INTRODUCTION TO MEASURING INSTRUMENTS: Classification of Instrument – deflecting, controlling and damping torques – Ammeters and Voltmeters – PMMC, moving iron, Electrostatic, induction type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range of instruments.

UNIT–II

MEASURMENT OF POWER & ENERGY: Single phase dynamometer wattmeter – Expression for deflecting and control torques. Measurement of active and reactive power in balanced and unbalanced systems, power factor meters, induction type energy meter. Single & Three phase – driving and braking torques – errors and compensations - testing by phantom loading using R.S.S. meter.

UNIT–III

DC, AC BRIDGES: Methods of measuring low, medium and high resistance – sensitivity of wheat-stone's bridge –Kelvin's double bridge for measuring low resistance.Measurement of inductance-Maxwell's bridge, Hay's bridge, Anderson's bridge. Measurement of capacitance and loss angle – Desaunty's Bridge – Wien's bridge – ScheringBridge.

UNIT – IV

D.C & A.C POTENTIOMETERS, INSTRUMENT TRANSFORMER: Principle and operation of D.C. Crompton's potentiometer standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – application. CT and PT – Ratio and phase angle errors.

UNIT–V

TRANSDUCERS: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers , LVDT Applications, Strain and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes.

TEXT BOOKS:

1. A. K. Sawhney", "Electrical & Electronic Measurements", Dhanpat Rai & Co. Publications, 2005.
2. "G. K. Banerjee", "Electrical & Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016
3. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements ", BS Publications, 2012.

REFERENCEBOOKS:

1. "R. K. Rajput", "Electrical & Electronic Measurements & Instrumentation", S. Chand and Company Ltd., 2007.
2. "Buckingham and Price", "Electrical Measurements", Prentice – Hall. 1988.
3. "Reissland, M.U", "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
4. "E. W. Golding and F. C. Widdis", "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2015.

COURSE OUTCOMES:

After completion of this course, the students will be able to

- Understand different types of measuring instrument, their construction, operation and characteristics
- Identify the instruments suitable for typical measurements
  Apply the knowledge about transducers and instrument transformer to use them practically and effectively.

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III Year B.Tech EEE-II SEM **L T/P/D C**

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(R18A0415) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

- To understand the basics of microprocessors and microcontrollers architectures and its functionalities.
- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
- To design and develop Microprocessor/ microcontroller based systems for real time applications using low level language like ALP.
- To understand the concepts of ARM processor.

UNIT - I

8086 ARCHITECTURE: Architecture of 8086, Register Organization, Programming Model, Memory addresses, Memory Segmentation, Physical Memory Organization, Signal descriptions of 8086-Common Function Signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT - II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Procedures, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT - III

I/O INTERFACE: 8255 PPI, Various Modes of Operation and Interfacing to 8086, D/A and A/D Converter, Stepper motor, Interfacing of DMA controller 8257

INTERFACING WITH ADVANCED DEVICES: Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine, architecture of 8259.

COMMUNICATION INTERFACE: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT - IV

INTRODUCTION TO MICROCONTROLLERS: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs, memory interfacing to 8051

UNIT - V

8051 REAL TIME CONTROL: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters **ARM PROCESSOR:** Fundamentals, Registers, Current program status register, Pipeline, Interrupt and the vector table.

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller, 3rd Ed., Cengage Learning.
3. ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.

COURSE OUTCOMES:

After going through this course the student will

1. Learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. Learn hardware and software interaction and integration.
3. Learn the design of microprocessors/microcontrollers-based systems

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III B.Tech EEE II SEM

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(R18A0214) POWER SYSTEM OPERATION AND CONTROL

Pre-requisites: Power System-I, Power System-II

COURSE OBJECTIVES:

- To give the knowledge on per unit system and faults.
- Give the knowledge of iterative method in power systems.
- To understand the concepts load flow studies.
- To understand Power systems stability
- To understand PF and Computer control in power systems

UNIT- I:

SYMMETRICAL COMPONENTS AND FAULT CALCULATIONS: Significance of positive, negative and zero sequence components, sequence impedances and sequence networks, fault calculations, sequence network equations, single line to ground fault, line to line fault, double line to ground fault, three phase faults, faults with fault impedance.

UNIT-II:

PER UNIT REPRESENTATION OF POWER SYSTEMS: The one line diagram, impedance and reactance diagrams, per unit quantities, changing the base of per unit quantities, advantages of per unit system.

LOAD FLOW STUDIES I: Bus Incidence Matrix, Y-bus formation by Direct Methods, Numerical Problems. Derivation of Static load flow equations. Load Flow Solutions Using Gauss Seidel Method: Load flow solution with and without P-V buses.

UNIT-III:

LOAD FLOW STUDIES II: Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (One Iteration only) and finding Line Flows/Losses for the given Bus Voltages, Newton Raphson Method: Load Flow Solution with and without P-V Buses, Derivation of Jacobian Elements, Fast Decoupled Method.

UNIT-IV:

POWER SYSTEM STABILITY: The stability problem – Concepts of Steady state stability, transient stability and Dynamic Stability - Swing equation. Equal area criterion of stability - Applications of Equal area criterion, Step by step solution of swing equation - Factors affecting transient stability.

UNIT-V:

PF CONTROL: Basics of speed governing mechanism and modeling – Control area concept, LFC control of a single area system, two area system.

COMPUTER CONTROL OF POWER SYSTEMS: System monitoring - data acquisition and control. System hardware configuration – SCADA and EMS functions.

TEXT BOOKS:

1. C.L.Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Publishing Co., 2001.
2. D.P.Kothari and I.J.Nagrath, Modern Power System Analysis, 4th Edn, Tata McGraw Hill Education Private Limited2011.

REFERENCE BOOK:

1. D. P. Kothari: Modern Power System Analysis-Tata McGraw Hill Pub. Co. 2003.

COURSE OUTCOMES:

At the end of the course the student will be able to:

- Understand the concept of per unit system and faults in power systems.
- Evaluate the admittance matrix of a given power systems.
- Analyze the power system using iterative methods.
- Understand the concept of stability in power system.
- Understand the PF and computer control in power system.

PROFESSIONAL ELECTIVE - II

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(PROFESSIONAL ELECTIVE – II)
(R18A0463) SYSTEMS AND SIGNAL PROCESSING

COURSE OBJECTIVES:
The main objectives of the course are:

- To understand the basic concepts of basic elementary signals and Fourier Series representation.
- To Master the representation of signals in the frequency domain using Fourier transforms and Discrete Fourier transform
- To learn the Mathematical and computational skills needed to understand the principal of Linear System and digital signal processing fundamentals.
- To understand the implementation of the DFT in terms of the FFT.
- To learn the Realization of Digital Filters

UNIT I:
INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Classification of Signals, Basic Operations on signals.
FOURIER SERIES: Exponential Fourier series, Dirichlet's conditions, Complex Fourier Spectrum.

UNIT II:
FOURIER TRANSFORMS: Fourier transform of arbitrary signal, Fourier transform of standard signals.
DISCRETE FOURIER TRANSFORMS: Computation of DFT, Linear Convolution of Sequences using DFT, Over-lap Add Method, and Over-lap Save Method**.**

UNIT III:
FAST FOURIER TRANSFORMS: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT.

UNIT IV:
INTRODUCTION TO LINEAR SYSTEMS: Introduction to Systems, Classification of Systems. **INTRODUCTION TO DIGITAL SIGNAL PROCESSING:** Introduction to Digital Signal Processing, Linear Shift Invariant Systems, Stability, and Causality of Discrete time systems

UNIT V:
Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Region of convergence in Z-Transform.
REALIZATION OF DIGITAL FILTERS: Realization of Digital Filters – Direct and Canonic form.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems – A. Anand Kumar, PHIPublications, 3rd edition.
3. DigitalSignalProcessing,Principles,Algorithms,andApplications:JohnG.Proakis,Dimitris
4. G. Manolakis, Pearson Education / PHI, 2007.
5. Digital Signal ProcessingA. Anand Kumar, PHIPublications.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009.
4. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009.

COURSE OUTCOMES:

After completion of the course, the student would be able to:

- Understand the basic elementary signals.
- Represent signals in the frequency domain using Fourier Series, Discrete Fourier series, Fourier transform and Discrete Fourier transform techniques.
- Understand the principle of Linear System and digital signal processing fundamentals.
- Implement DFT of any signal using FFT algorithm.
- Realize Digital Filters

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(PROFESSIONAL ELECTIVE – II)
(R18A0215) ELECTRICAL ESTIMATION AND COSTING

COURSE OBJECTIVES:

- Emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
- Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design.
- These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage.

UNIT-I:

DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of Electrical Installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution Board, guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT-II:

ELECTRICAL INSTALLATION OF BUILDINGS AND SMALL INDUSTRIES: Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT-III:

OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports for Transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT-IV:

SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substation, Floor mounted type.

UNIT-V:

DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in Illumination, laws of illumination, various types of light sources, Practical lighting schemes.

TEXT BOOKS:

1. Electrical Design Estimating and Costing, K.B.Raina, S.K.Bhattacharya, New Age International Publisher.
2. Design of Electrical Installations, Dr. V.K. Jain, Dr. Amitabh Bajaj, University Science Press.
3. Electricity pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P.E., CRC Press.

REFERENCE BOOKS:

1. Guide for Electrical Layout in residential buildings, Indian Standard Institution, IS:4648-1968
2. Electrical Installation buildings Indian Standard Institution, IS: 2032.

COURSE OUTCOMES:

After going through this course the student gets knowledge on:

- The estimating and costing aspectsof all electrical equipment, installation and designs to analyze the cost viability.
- Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design.
- These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage and apply the above concepts to real- world electrical and electronics problems and applications.

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(PROFESSIONAL ELECTIVE – II)
(R18A0216) OPTIMIZATION TECHNIQUES

COURSE OBJECTIVES:
This course introduces various optimization techniques:

- To understand classical, linear programming, transportation problem, simplex algorithm, dynamic programming,
- Constrained and unconstrained optimization techniques for solving and optimizing an electrical and electronic engineering circuits design problems in real world situations.

UNIT-I
INTRODUCTION & CLASSICAL OPTIMIZATION TECHNIQUES: Statement of an Optimization problem — design vector — design constraints — constraint surface — objective function — objective function surfaces — classification of Optimization problems Single variable Optimization — multi variable Optimization without constraints — necessary and sufficient conditions for minimum/maximum multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers — multivariable Optimization with inequality constraints — Kuhn — Tucker conditions.

UNIT — II
LINEAR PROGRAMMING: Standard form of a linear programming problem — geometry of linear programming problems — definitions and theorems — solution of a system of linear simultaneous equations — pivotal reduction of a general system of equations — motivation to the simplex method — simplex algorithm.

UNIT – III
TRANSPORTATION PROBLEM & UNCONSTRAINED OPTIMIZATION: Finding initial basic feasible solution by north — west corner rule, least cost method and Vogel's approximation method testing for optimality of balanced transportation problems, one dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method. Univariate method, Powell's method and steepest descent method.

UNIT-IV
CONSTRAINED NONLINEAR PROGRAMMING: Characteristics of a constrained problem, Classification, Basic approach of Penalty FtIn method; Basic approaches of lnteñor and Exterior penalty function methods, Introduction to convex Programming Problem.

UNIT—V
DYNAMIC PROGRAMMING: Dynamic programming multistage decision processes — types — concept of sub optimization and the principle of optimality — computational procedure in dynamic programming — examples illustrating the calculus method of solution – examples illustrating the tabular method of solution.

TEXT BOOKS

1. Engineering optimization. Theory and practice."S. S.Rao, New Age International (P) Limited.
2. Optimization Methods in Operations Research and systems Analysis, K.V. Mittal and C. Mohan, New Age International (P) Limited.

REFERENCE BOOKS

1. Operations Research, Dr. S.D.Shama. Introductory Operations Research, H.S. Kasene & K.D. Kumar, Springer (India), Pvt .LTc.
2. Operations Research: An Introduction, H.A.Taha, Pearson Pvt. Ltd.
3. Operations Research, Rk, hard Bronson, Govindasami Naadimuthu, Tata Mc Graw — Hill Company Limited.

COURSE OUTCOMES:

After going through this course the student gets a thorough knowledge on:

- Optimization of electrical and electronics engineering problems through classical optimization techniques, linear programming, simplex algorithm, transportation problem, unconstrained optimization.
- Constrained non-linear programming and dynamic programming, with which he/she can able to apply the above conceptual things to real world electrical and electronics problems and applications.

OPEN ELECTIVE III

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(OPEN ELECTIVE - III)
(R18A0452) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

- To study overview of Embedded Systems, Robots, Microprocessors& Microcontrollers.
- To study in detail about Robotics and sensors.
- To study about AVR RISC Microcontroller architecture in detail.
- To study about ARM Processor in detail.
- To study about Artificial Intelligence in Robotics.

UNIT -I

INTRODUCTION TO EMBEDDED SYSTEM DESIGN: Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller.

UNIT - II

ROBOTICS: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

THE AVR RISC MICROCONTROLLER ARCHITECTURE: Introduction, AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory ,EEPROM ,I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM PROCESSOR: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

1. Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
2. Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education,
   India2003.
3. ARM System Developer’s Guide: Designing and Optimizing System Software-Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.
2. Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech
3. Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to

- Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
- Understand in detail about Robotics and sensors.
- Understand AVR RISC Microcontroller architecture in detail.
- Understand about ARM Processor in detail.
- Understand about Artificial Intelligence in Robotics.

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(OPEN ELECTIVE – III)

(R18A0453) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

- To study IoT Networking Core
- To study IoT related network fundamentals
- To study IoT Architecture.
- To study IoT Application Development procedure
- To study various case studies and IoT applications.
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UNIT - I

THE IOT NETWORKING CORE(TECHNOLOGIES INVOLVED IN IOT DEVELOPMENT): Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

UNIT - II

NETWORK FUNDAMENTALS: Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

UNIT - III

IOT ARCHITECTURE: History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring& Sensing, Remote Controlling, Performance Analysis. The Architecture the Layering concepts, IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT.

UNIT IV:

IoT APPLICATION DEVELOPMENT: Application Protocols MQTT, REST/HTTP, CoAP, MySQL.
Back-end Application DesigningApache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools.

UNIT IV:

CASE STUDY & IOT APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCE BOOKS:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. Designing the Internet of Things, Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata McGraw Hill, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

At the end of the course, the student will be able to

- Understand IoT Networking Core
- Understand IoT related network fundamentals
- Understand IoT Architecture.
- Understand IoT Application Development procedure
- Understand various case studies and IoT applications.

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(OPEN ELECTIVE – III)

(R18A0554) OPERATING SYSTEM CONCEPTS

COURSE OBJECTIVES:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management

UNIT - I

INTRODUCTION: Objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

UNIT-II

PROCESS MANAGEMENT: Process concept, Process states, threads.
CPU SCHEDULING: Scheduling algorithms, multiple processors and real time scheduling.
PROCESS SYNCHRONIZATION: Critical section problems, Peterson's Solution, semaphores, monitors.

UNIT-III

MEMORY MANAGEMENT: Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation.
VIRTUAL MEMORY –Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

UNIT-IV

FILE MANAGEMENT: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

UNIT-V:

DISK MANAGEMENT: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.
DEAD LOCKS: Characterization, Dead lockPrevention, dead lock Avoidance, Dead lock Detection and Recovery.

TEXT BOOK:

1. Operating Systems Concepts –Avil Silberschatz j, Peter Galvin, GreyGagne

REFERENCE BOOKS:

1. Modern Operating Systems –Andrew S. Tanenbaum, PHI
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India

COURSE OUTCOMES:

At the end of the course the students are able to:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

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(OPEN ELECTIVE – III)
(R18A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

- To facilitate the understanding of Quality Management principles and process.
- To understand Customer focus, Employee focus and their involvement andSupplier Management.

UNIT – I

INTRODUCTION: The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

CUSTOMER FOCUS AND SATISFACTION: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

ORGANIZING FOR TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

THE COST OF QUALITY: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOKS:

1. Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
2. Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

1. Beyond TQM / Robert L. Flood
2. Total quality management by Paneer Selvam
3. Statistical Quality Control / E.L. Grant.
4. Total Quality Management: A Practical Approach/H. Lal
5. Quality Management/Kanishka Bedi/Oxford University Press/2011
6. Total Engineering Quality Management/Sunil Sharma/Macmillan

COURSE OUTCOMES:

- The student would be able to apply the tools and techniques of quality managementto manufacturing and services processes.
- To give the students an overview of TQM, various Quality aspects and importance of Top Management Commitment in any organization for maintaining product / services quality.

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(OPEN ELECTIVE - III)

(R18A0251) ELECTRICAL SYSTEMS & APPLICATIONS

COURSE OBJECTIVES:

- To introduce the fundamental concepts of electro mechanical energy conversion
- To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

UNIT- I

ELECTRICAL SYSTEM COMPONENTS: LT system wiring components, Selection of Cables, Wires, Switches, Distribution Box, Metering System, Tariff structure, Protection Components- Fuse, MCB, MCCB, ELCB, Inverse current characteristics, Symbols, Single Line Diagram (SLD) of a wiring system, Contactor, Isolator, Relays, MPCB, Electric shock and Electrical safety practices.

UNIT- II

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS: Types of residential and commercial wiring systems, general rules and guidelines for installation. Load calculation and sizing of wire, rating of main switch, distribution board and protection devices - Earthing system calculations. Requirements of commercial installation - deciding lighting scheme and number of lamps, earthing of commercial installation, selection and sizing of components.

UNIT- III

ILLUMINATION SYSTEMS: Understanding various terms related to light intensity, Lumens, candle power, lamp efficiency, and specific consumption. Various illumination schemes- Incandescent lamps, modern luminaries like CFL, LED and their operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

UNIT-IV:

INDUSTRIAL ELECTRICAL SYSTEMS: UPS System-Types, Principle of operation. Battery banks, sizing the UPS and Battery Banks, Selection of UPS and Battery Banks.

UNIT-V:

SINGLE PHASE AC MOTOR AND SPECIAL MOTORS: Constructional features, Principle of operation, Characteristics, Speed control and Applications of Single phase AC motor, Stepper motor, Brushless DC motor and Universal motor(Qualitative Treatment only).

TEXT BOOKS:

1. S. L. Uppal and G. C. Garg, “Electrical Wiring, Estimating & Costing”, Khanna publishers, 2008.
2. K. B. Raina, “Electrical Design, Estimating & Costing”, New age International, 2007.
3. H. Joshi, “Residential Commercial and Industrial Systems”, McGraw Hill Education, 2008.

REFERENCE BOOKS:

1. N.V. Suryanarayana, "Utilization of Electrical Power including Electric drives and Electric traction", New Age International (P) Limited Publishers, 1st Edition,1994.
2. E. Open Shaw Taylor, "Utilization of Electric Energy", Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

- Maintain/Troubleshoot various lamps and fittings in use.
- Design Illumination systems for various applications.
- Utilize effectively the electrical systems in industries.

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(OPEN ELECTIVE - III)
(R18A1253) SOFTWARE TESTING TECHNIQUES

COURSE OBJECTIVES:

- Knowing the concepts of Software Engineering and software development life cycle.
- Understanding the foundations, techniques, and tools in the area of software testing and its practice in the industry.
- Learning the functional aspect of the various testing techniques.
- Knowledge of the creation of test cases and usage of testing tools.

UNIT – I

INTRODUCTION: Software, Software Engineering, Process Models: Waterfall Model, Spiral Model, Prototyping, V Model. Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester – Independent Verification and Validation.

UNIT – II

SOFTWARE TESTING REQUIREMENTS: Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews: Peer Review – Walkthrough - Inspection - Checklists of Review Process - Review Log.

UNIT – III

TESTING TECHNIQUES: White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision/Branch Coverage – Basic Path Testing – Control Flow Graph Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques: Boundary Value Analysis – Equivalent Class Partition – Cause-Effect Analysis – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.

UNIT – IV

TESTING TYPES: Unit Testing, Functional Testing: Smoke Testing – Integration, System Testing, User Acceptance Testing - Non Functional Testing:– Performance Testing – Recovery Testing – Security Testing – Compatibility Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - Data ware House Testing and Business Intelligence Testing – SOA Testing - Mobile Testing.

UNIT - V

TEST CASE DESIGN: Definition of Test Case - Standards, Guidelines and Naming Conventions – Characteristics of Good Test Cases – Test Case templates – Creation of Test Case – Requirement Coverage –Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting

of Test Execution – Definition of Risk - Risk Based Testing Approach.Overview of Testing Tools like Winrunner, Loadrunner, Selenium, JMeter.

TEXT BOOKS:

1. Software Testing Techniques – BorisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
3. S.Subashni, N.Satheesh Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, ”Software Testing”, Umayam Publications , First edition, 2013.

REFERENCE BOOKS:

1. Srinivasan Desikan, Gopalaswamy Ramesh,”Software Testing: Principles and Practice”, Pearson Education India, First Impression 2006.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing Concepts and Tools: P.NageshwarRao, dreamtechPress.
4. Art of Software Testing – Meyers, John Wiley.
5. Software Testing in the Real World – Edward Kit, Pearson.

COURSE OUTCOMES:

- Analyze the strategies for software testing.
- Identify the issues in test management and testing activity.
- Apply the suitable testing strategy for a given application.
- Development of test cases and selection of appropriate testing tool**.**

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(R18A0286) POWER ELECTRONICS AND SIMULATION LABORATORY

COURSE OBJECTIVES:

The student will understand:

- The characteristics of power electronic devices.
- The operation of single-phase voltage controller, converters and Inverters circuits with R and RL loads. Analyze the TPS7A4901, TPS7A8300 and TPS54160 buck regulators.

Part - A

The following experiments are required to be conducted compulsory experiments:

1. Study the Characteristics of SCR, MOSFET & IGBT
2. Single Phase half controlled converter with R load and RL loads
3. Single Phase fully controlled bridge converter with R and RL loads
4. Three Phase half controlled bridge converter with R-load
5. Single Phase AC Voltage Controller with R and RL Loads
6. Single Phase Cycloconverter with R and RL loads
7. Single Phase series inverter with R and RL loads
8. DC Jones chopper with R and RL Loads

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list.

Part - B

1. Single-phase full converter using RLE loads and single-phase AC voltagecontroller using RLE loads using PSPICE.
2. Resonant pulse commutation circuit and Buck chopper using PSPICE.
3. Single phase Inverter with PWM control using PSPICE.
4. Single Phase Mc-Murray converter with R and RL loads
5. Single Phase dual converter with RL loads

COURSE OUTCOMES:

After completion of this course, the student is able to

- Understand the operating principles of various power electronic converters.
- Use power electronic simulation packages& hardware to develop the power converters.
- Analyze and choose the appropriate converters for various applications.

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(R18A0487) MICROPROCESSORS AND MICROCONTROLLERSLAB

COURSE OBJECTIVES:

- To develop and execute variety of assembly language programs of Intel 8086 including arithmetic and logical, sorting, searching, and string manipulation operations.
- To develop and execute the assembly language programs for interfacing Intel 8086 with peripheral devices.
- To develop and execute simple programs on 8051 microcontroller.

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for8086.
5. Program for digital clock design using8086.
6. Interfacing ADC and DAC to8086.
7. Parallel communication between two microprocessors using8255.
8. Serial communication between two microprocessor kitsusing8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of8051.
11. Program and verify Timer/ Counterin8051.
12. Program and verify Interrupt handling in8051
13. UART Operation in8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to8051.
16. Interfacing Matrix/ Keyboard to8051.
17. DataTransferfromPeripheraltoMemorythroughDMAcontroller8237/8257.

Note: - Minimum of 12 experiments to be conducted

COURSE OUTCOMES:

After going through this course the student will be able to

- Apply the concepts in the design of microprocessor/microcontroller based systems in real time applications
- Develop and execute the assembly language programs for interfacing Intel 8086 with peripheraldevices.
- Develop and execute simple programs on 8051 microcontroller.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B.Tech EEE- II SEM **L T/P/D /C**
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(MANDATORY COURSE)
(R18A0521) CYBER SECURITY

COURSE OBJECTIVES:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

UNIT - I

INTRODUCTION TO CYBER SECURITY: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

CYBERSPACE AND THE LAW & CYBER FORENSICS: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

CYBERCRIME: MOBILE AND WIRELESS DEVICES: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

CYBER SECURITY: ORGANIZATIONAL IMPLICATIONS: Introduction cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

CYBERCRIME AND CYBER TERRORISM: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

PRIVACY ISSUES: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&F Group.

COURSE OUTCOMES:

The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

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IV B.Tech EEE I SEM

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(R18A0217) SWITCHGEAR AND PROTECTION

COURSE OBJECTIVES:

- To introduce protection equipment like Circuit Breakers and Relays
- To introduce protection of Generators,Transformers and feeder bus bars from over Voltages and other hazards.
- To emphasize neutral for overall protection.

UNIT - I:

CIRCUIT BREAKERS: Elementary principles of arc interruption, Recovery, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Current Chopping and Resistance Switching - CB ratings and Specifications. Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT –II:

ELECTROMAGNETIC AND STATIC RELAYS: Principle of Operation and construction of attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Relay Classification: Instantaneous, DMT and IDMT types. Application of relays: Over current/Under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays. Universal torque equation. Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relay and Comparison, Static Relay.

UNIT - III:

GENERATOR & TRANSFORMER PROTECTION: Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Protection of transformers: Percentage Differential Protection, Buchholtz relay Protection.

UNIT-IV:

FEEDER AND BUS-BAR PROTECTION & GROUNDING: Protection of Lines - Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay. Protection of Bus bars - differential protection.

UNIT -V:

PROTECTION AGAINST OVER VOLTAGES: Generation of Over Voltages in Power Systems.-Protection against Lightning over Voltages - Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

TEXT BOOKS:

1. Switchgear and Protection by Sunil S Rao, Khanna Publlishers
2. Power System Protection and Switchgear, Bhavesh Bhalaji, R.P.Mahesheari, Nilesh G.Chothani, Oxford University Press.

REFERENCE BOOKS:

1. Fundamentals of Power System Protection by Paithankar and S.R.Bhide., PHI, 2003. Art & Science of Protective Relaying by C R Mason, Wiley Eastern Ltd.
2. Electrical Power Systems by C.L.Wadhwa, New Age international (P) Limited, Publishers, 3rd editon
3. A Text book on Power System Engineering by B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, Dhanpat Rai & Co Pvt.Ltd.

COURSE OUTCOMES:

After this course, the student

- Gets a thorough knowledge on, various types of protective devices (circuit breakers, relays etc.) and their co-ordination, protection of generators, transformers, feeders, bus-bars, through different types of protective devices, overvoltage protection, lightening, concept of earthing and grounding
- By applying the above concepts to real-world electrical and electronics problems and applications.

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IV B.Tech EEE I SEM	**L**	**T/P/D**	**C**
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(R18A0218) ELECTRICAL DRIVES

COURSE OBJECTIVES:

- To get an understanding of Power Electronics applications in AC and DC drives. Control of DC motor drives with single phase &three phase converters and choppers.
- To learn about AC motor drives using variable frequency converters VSI, CSI etc..

UNIT – I

CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS: Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to D.C separately excited and D.C series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics - Problems on Converter fed D.C motors.

CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS: Three phase semi and fully controlled converters connected to D.C separately excited and D.C series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics –Problems.

UNIT-II

FOUR QUADRANT OPERATION OF DC DRIVES: Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT – III

CONTROL OF DC MOTORS BY CHOPPERS: Single quadrant, Two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed D.C Motors – Closed Loop operation (Block Diagram Only)

UNIT-IV

CONTROL OF INDUCTION MOTOR THROUGH STATOR VOLTAGE AND STATOR FREQUENCY:

Variable voltage characteristics - Control of Induction Motor by AC Voltage Controllers – Waveforms – speed torque characteristics. Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and Cycloconverter-PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –V

CONTROL OF SYNCHRONOUS MOTORS AND INDUCTION MOTOR FROM ROTOR SIDE: Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems. Separate control & self - control of synchronous motors – Operation of self-controlled synchronous

motors by VSI and CSI Cycloconverter. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cycloconverter, PWM, VSI, CSI

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI.

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publilcations.
4. A First course on Electrical Drives – S K Pillai New Age International (P) Ltd. 2nd Editon.

COURSE OUTCOMES:

At the end of the course the student would be able to:

- Identify the choice of the electric drive system based on their applications.
- Explain the operation of single and multi-quadrant electric drives.
- Analyze single phase and three phase rectifiers fed DC motors as well as chopper fed DC motor.
- Explain the speed control methods for AC-AC & DC-AC converters fed to Induction motors and Synchronous motors with closed loop, and open loop operations.

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(R18A0219) EHV AC & HVDC TRANSMISSION

COURSE OBJECTIVES:

- To understand the concept of extra high voltage AC and high voltage DC transmission.
- To study the behavior of line parameters for extra high voltages.
- To study the effect of corona, electrostatic field, voltage control at extra high voltage.
- To understand the basic concepts of HVDC, HVDC converters.
- To study the effect of harmonics and methods of suppression of harmonics by using filters.

UNIT – I

INTRODUCTION: Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses - mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples Line and Ground Reactive Parameters - Line inductance and capacitance – sequence inductances and capacitances – modes of propagation – ground return - Examples.

UNIT-II

CORONA EFFECTS: Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics - limits and measurements of AN – relation between single phase and three phase AN levels – Examples - Radio interference (RI) Electrostatic Field - Calculation of electrostatic field of EHV AC lines – effect on humans, animals and plants – Electromagnetic interference.

UNIT – III

VOLTAGE CONTROL: Power circle diagram and its use – voltage control using synchronous condensers – cascade connection of shunt and series compensation – sub synchronous resonance in series capacitor – compensated lines – static VAR compensating system.

UNIT – IV

HVDC - BASICS & ANALYSIS OF CONVERTERS: Necessity of HVDC Transmission**.** Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links - Apparatus required for HVDC Systems - Comparison of EHV AC & HVDC Transmission, Application of HVDC Transmission System. Choice of Converter configuration - Analysis of Graetz - characteristics of six Pulse converters and twelve pulse converters.

UNIT – V

HARMONICS & FILTERS: Harmonics **-** Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non- Characteristic harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics. Filters**:** Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p) Ltd.
2. K. R. Padiyar (2005), HVDC Power Transmission Systems: Technology and system Interactions, 1st edition, New Age International (P) Ltd, New Delhi.
3. EHV AC and HVDC Transmission and Distribution Engineering by S. Rao, Khanna Publishers, 3rd edition.

REFERENCE BOOKS:

1. E. W. Kimbark (2006), Direct Current Transmission, 2nd edition, John Wiley & Sons, New Delhi.
2. K. R. Padiyar (2009), FACTS Controllers in power Transmission and Distribution, 1st edition, New Age International (P), Ltd, New Delhi.
3. N. G. Hingorani, L. Guygi (2001), Understanding FACTS, 1st edition, IEEE Press, USA.

COURSE OUTCOMES:

After going through this course, the student gets knowledge on

- The Concept of extra high voltage AC and high voltage DC transmission.
- The behavior of the line parameters for extra high voltages.
- The effect of corona, electrostatic field, voltage control for extra high voltages.
- The basic concepts of HVDC, HVDC converters.
- The effect of harmonics and suppression of harmonics by using filters.

PROFESSIONAL ELECTIVE - III

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(PROFESSIONAL ELECTIVE - III)
(R18A0513)COMPUTER NETWORKS

COURSE OBJECTIVES:

- To introduce the fundamental types of computer networks.
- To demonstrate the TCP/IP & OSI model merits & demerits.
- To know the role of various protocols in Networking.

UNIT - I

INTRODUCTION: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet. Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II

DATA LINK LAYER: Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols

MULTIPLE ACCESS PROTOCOLS - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III

NETWORK LAYER: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms,

IP addresses, CIDR, Subnetting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV

TRANSPORT LAYER: Services provided to the upper layers elements of transport protocol-addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT - V

APPLICATION LAYER: Introduction, providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; RSA algorithm,

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

COURSE OUTCOMES:

- To understand and explore the basics of Computer Networks and Various Protocols. Student will be in a position to understand the World Wide Web concepts.
- Able to administrate a network and flow of information further Student can understand easily the concepts of network security, Mobile, and ad hoc networks.

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(PROFESSIONAL ELECTIVE - III)

(R18A0220) ADVANCED POWER ELECTRONICS

COURSE OBJECTIVES:

- With the advent of semiconductor devices, revolution is taking place in the power transmission distribution and utilization.
- This course introduces the basic concepts of power semiconductor devices, converters and choppers and their analysis

UNIT-I:

ADVANCED SOLID STATE DEVICES: MOSFETs, IGBT, GTO, and IGCT. Power modules, intelligent power modules, gating circuits Thermal design, protection. Digital signal processors used in their control. Non-isolated DC-DC converters: Buck, boost, buck-boost, CUK, SEPIC, Zeta in DCM and CCM Isolated dc-dc converters: Fly back, forward, Cuk, SEPIC, Zeta, half bridge, push-pull and bridge in DCM and CCM. Single-phase, single-stage converters (SSSSC), power factor correction at ac mains in these converters. Their application in SMPS, UPS, welding and lighting systems.

UNIT-II:

SINGLE-PHASE IMPROVED POWER QUALITY AC-DC CONVERTERS: Buck, boost, buck-boost, PWM VSC (Voltage source converters), multilevel VSCs, PWM CSC (Current voltage source converters).Three-phase improved power quality ac-dc converters: VSC, multilevel VSCs, multi pulse VSCs, PWM CSC (Current voltage source converters).Multi pulse ac-dc converters: Diode and thyristor based converters.

UNIT-III:

POWER QUALITY MITIGATION DEVICES: Passive filters, active filters, hybrid filters. FACTS devices: TCR (thyristor controlled reactor), TSC (thyristor switched capacitors). STATCOM (Static synchronous compensator). SSSC (Static series synchronous compensator). UPFC (Unified power flow controller), IPFC (Interline power flow controller).

UNIT-IV:

HVDC (HIGH VOLTAGE DIRECT CURRENT) SYSTEM: 12-pulseconverter based HVDC systems. HVDC light, HVDC PLUS (Power universal link). Multi pulse and multilevel VSC based flexible HVDC systems.

UNIT-V:

SOLID STATE CONTROLLERS FOR MOTOR DRIVES: Vector control and direct torque control of induction, synchronous, permanent magnet fed, synchronous reluctance motors. Permanent magnet brushless DC (PMLDC) and switched reluctance motors. LCI (load commutated inverter)fed large rating synchronous motor drives. Energy conservation and power quality improvements in these drives.

TEXT BOOKS

1. R.S. Ramshaw, "Power Electronics Semiconductor Switches", Champman & Hall, 1993.
2. N. Mohan, T. M. Undeland and W.P. Robbins,"Power Electronics, Converter, Application and Design", Third Edition, John Willey & Sons, 2004.
3. M. H. Rashid, "Power Electronics, circuits, Devices and Applications", Pearson, 2002, India.

REFERENCE BOOKS

1. K. Billings, "Switch Mode Power Supply Handbook", McGraw-Hill, 1999, Boston.
2. A. I.Pressman, "Switch Mode Power Supply Design", McGraw-Hill, 1999, New York.
3. B. K.Bose, "Power Electronics and Variable Frequency Drive", Standard Publishers Distributors, 2000.

COURSE OUTCOMES:

- Competency in function of various power electronics devices.
- Skill of analyzing power electronic devices, Know-how of advance Power electronics converter, Fitness in mitigating converter harmonics.
- Competency in developing Dynamic model of drive system, Fitness' in solving typical drive issues. Ability in control strategy of cyclo converter based Drives, Skill in Transient analysis of drive system.
- Competency in designing FACTS controllers, Capability in designing isolated converters.
- Ability to dynamic analysis of power Converters, Competency in operation of resonant converter.
- Capability in Control of Switched Reluctance Motor Drives, Competency in Control of BLDC Motor Drives. Proficiency in HVDC converter systems design. Know-how of operation of Power electronics in HVDC system.

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(PROFESSIONAL ELECTIVE - III)
(R18A1262)ARTIFICIAL NEURAL NETWORKS

COURSE OBJECTIVES:
The objectives of this course are to:

- Understand the basic building blocks of artificial neural networks (ANNs)
- Understand the role of neural networks in engineering and artificial intelligence modeling
- Provide knowledge of supervised/unsupervised learning in neural networks
- Provide knowledge of single layer and multilayerperceptron's.
- To know about self-organizational maps and Hopfield models.

UNIT -I:
INTRODUCTION: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

UNIT -II:
SINGLE LAYER PERCEPTRONS: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bays Classifier for a Gaussian Environment Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

UNIT -III:
BACK PROPAGATION: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT -IV:
SELF-ORGANIZATION MAPS (SOM): Two Basic Feature Mapping Models, Self Organization Map, SOM Algorithm, Properties of Feature Map, Computer 168 ELECTRONICS AND COMMUNICATION ENGINEERING 2013-14 Simulations, Learning Vector Quantization, Adaptive Patter Classification

UNIT -V:
NEURO DYNAMICS: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, Computer Experiment

TEXT BOOKS:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.
2. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

REFERENCE BOOKS:

1. Artificial Neural Networks - B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Inteligance, Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

COURSE OUTCOMES:

After the course the student should be able to:

- Explain the function of artificial neural networks of the Back-prop, Hopfield and SOM type
- Explain the difference between supervised and unsupervised learning
- Describe the assumptions behind, and the derivations of the ANN algorithms dealt with in the course
- Give example of design and implementation for small problems
- Implement ANN algorithms to achieve signal processing, optimization, classification and process modeling

PROFESSIONAL ELECTIVE - IV

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(PROFESSIONAL ELECTIVE - IV)
(R18A0221) SOLAR & WIND ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To understand the basic concepts of Solar energy,Solar radiation & Wind turbines
- To understand the fundamentals of solar cells, PV systems and their classification.
- To understand the generation schemes with variable speed Wind turbines.
- To study and understand the technologies related to subsystems like Frequency converters, Inverters, Charge controllers, etc., that form part of Solar and Wind power plants.
- To study the concepts of integration of Solar and Wind power plants with Grid

UNIT-I:

SOLAR ENERGY BASIC CONCEPTS: Introduction to solar energy, Characteristics of solar radiation, Spectral distribution, Power density, Solar constant. Geometry of the Earth and Sun, Atmospheric effects on solar radiation - Estimation of solar energy availability - Solar radiation measurement and instrumentation, solar radiation data, Effect of collector tilt. Principle of direct solar energy conversion into electricity in a solar cell -Technologies-Amorphous, mono-crystalline, polycrystalline.

UNIT-II:

SOLAR CELL FUNDAMENTALS, PV SYSTEMS, BOS AND CLASSIFICATION: Solar cell properties. I-V characteristics, output power - maximum power point – Principles of maximum power point trackers. Cell efficiency - Fill factor - Effect of irradiation and temperature. Block diagram of a basic solar power plant, Balance of systems - PV arrays and modules, inverters, batteries, charge controllers and Power conditioners. Classification - Central Power Station System - Distributed PV System - Stand-alone PV system - Grid Interactive PV System - Small system for consumer applications - Hybrid solar PV system

UNIT-III:

FUNDAMENTALS OF WIND TURBINES: Power contained in wind - Thermodynamics of wind energy – Efficiency limit for wind energy conversion. Design of the wind turbine rotor: Diameter of the rotor – Choice of the number of blades – Choice of the pitch angle – The tower – The transmission system and gear box – Power speed characteristics – Torque speed characteristics. Wind turbine control systems: Pitch angle control – Stall control – Power electronic control – Yaw control – Control strategy.

UNIT-IV:

WIND GENERATOR SCHEMES WITH VARIABLE SPEED TURBINES: Review of modern wind turbine technologies, Fixed and Variable speed wind turbine, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent Magnet Synchronous Generators, Power electronics converters. Generator configurations, Converter control.

UNIT-V:

GRID INTEGRATION ISSUES: Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind

farm behavior during grid disturbances. Power quality issues. Power system interconnection experiences. Hybrid and isolated operations of solar PV and wind systems.

TEXT BOOKS:

1. Wind Electrical Systems, S.N. Bhardra, D.Kastha and S.Banerjee, Oxford University Press.
2. T. Ackermann, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
3. Solar Cells from Basics to Advanced Systems, Chenming Hu and Richard M. White, Tata McGraw Hill Education Private Limited.
4. Solar Cells – Operating Principles, Technology and System Applications, Martin A. Green, Prentice Hall Inc.

REFERENCE BOOKS:

1. Renewable Energy Sources, Twidell &Weir, fourth Edition (2009), Tata McGraw Hill Education Private Limited, New Delhi.
2. Grid integration of wind energy conversion systems. H. Siegfried and R. Waddington. John Wiley and Sons Ltd., 2006.
3. Non-Conventional Energy Sources, G.D.Rai, fourth edition (2009), Khanna Publishers, NewDelhi
5. Fundamentals of Renewable Energy Systems, D.Mukherjee, S.Chakrabarti, New Age International.
6. Renewable Energy Sources and Emerging Technologies, D. P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Private Limited.

COURSE OUTCOMES:

After going through this course, the student gets a working knowledge on:

- The basic concepts of solar energy, solar radiation and fundamentals of wind turbines.
- Different types of PV Solar cells, PV systems and their integration.
- Generation schemes with variable speed turbines and other types of Generators.
- Various other subsystems of Solar and Wind based power plants.
- Issues related to Grid-integration of Solar & Wind energy systems and their solutions

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(PROFESSIONAL ELECTIVE - IV)
(R18A0222) QUALITY AND RELIABILITY ENGINEERING

COUSRE OBJECTIVES:

- To introduce the basic concepts of reliability, various models of reliability
- To analyze reliability of various systems
- To introduce techniques of frequency and duration forreliability evaluation of repairable systems.

UNIT-I:

BASIC CONCEPTS: Definitions of quality and Reliability, Parameters and Characteristics, Quality control, statistical Quality Control, Reliability concepts. Concepts in Probability and Statistics : Events, Sample Space, Probability rules, Conditional probability, Dependent and Independent Events, Application of Probability concepts in Quality Control, Problems

UNIT-II:

INTRODUCTION TO PROBABILITY DISTRIBUTIONS: Normal, Poisson and Binomial distribution. Control Charts, Variable Chart – X Bar chart, R-chart and Sigma chart. Attribute Chart: P – Chart, nP Chart, C-Chart and U – Chart. Acceptance Sampling: Fundamentals of acceptance sampling, types of acceptance sampling, O.C Curve, AQL, LTPD, AOQL.

UNIT-III:

FAILURE DATA ANALYSIS: Introduction, Failure Data, Quantitative measures, MTTF, MTBF, Bathtub Curve, Mean Life, Life Testing, Problems, Introduction to Failure Mode and Effect Analysis.

UNIT-IV:

SYSTEM RELIABILITY: Series, parallel and mixed configuration, Block diagram concept, r- out-of-n structure solving problems using mathematical models. Reliability Improvement and Allocation : Difficulty in achieving reliability, Methods for improving reliability during design, Different techniques available to improve reliability, Optimization, Reliability-Cost trade off, Prediction and Analysis, Problems.

UNIT-V:

MAINTAINABILITY AND AVAILABILITY: Introduction, Formulas, Techniques available to improve maintainability and availability trade-off among reliability, maintainability and availability, Simple problems

TEXT BOOKS:

1. Roy Billinton, Ronald. N. Allan (2009), Reliability Evaluation of Engineering Systems, 4th edition, Plenum Press, New York, USA.
2. Hoang Pham (2003), Handbook of Reliability Engineering, 1st edition, Springer Verlag, New York.
3. Charles E. Ebeling (2010), An Introduction to Reliability and Maintainability *Engineering*, 3rd edition, Tata McGraw Hill Edition, New Delhi.

REFERENCE BOOKS:

1. Quality Planning and Analysis - Tata McGraw - Juran, J.M and Gryna, F.M. - Hill publishing Company Ltd., New Delhi, India – 1982.
2. Maintainability and Reliability Handbook of Reliability Engineering and Management - Editors – Ireson. W.G. and Cooms - C.F. McGraw - Hill Book Company Inc. – 1988.
3. Concepts in Reliability Engineering- Srinath L S - Affiliated East-West Press Private Limited, New Delhi, India. – 1985.
4. An Introduction to Reliability and Maintainability Engineering - TMH Charles Ebeling - Tata Mcgraw Hill – 2000.
5. Reliability Engineering - A K Govil - Prentice Hall – 1981.

COURSE OUTCOMES:

After completion of this course, the student will be able to

- Model various systems applying reliability networks
- Evaluate the reliability of simple and complex systems
- Estimate the limiting state probabilities of repairable systems
- Apply various mathematical models for evaluating reliability of irreparable systems

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(PROFESSIONAL ELECTIVE - IV)
(R18A0223) POWER PLANT ENGINEERING

COURSE OBJECTIVES:

- To study operation and maintenance of Power Stations.
- Able to learn about different power plants.
- To study about Non-Conventional Power Generation.

UNIT-I:

INTRODUCTION: Energy resources and their availability, types of power plants, selection of the plants, review of basic thermodynamic cycles used in power plants. Hydro Electric Power Plants : Rainfall and run-off measurements and plotting of various curves for estimating stream flow and size of reservoir, power plants design, construction and operation of different components of hydro-electric power plants, site selection, comparison with other types of power plants.

UNIT-II:

STEAM POWER PLANTS: Flow sheet and working of modern-thermal power plants, super critical pressure steam stations, site selection, coal storage, preparation, coal handling systems, feeding and burning of pulverized fuel, ash handling systems, dust collection-mechanical dust collector and electrostatic precipitator.

COMBINED CYCLES: Constant pressure gas turbine power plants, Arrangements of combined plants (steam & gas turbine power plants), re-powering systems with gas production from coal, using PFBC systems, with organic fluids, parameters affecting thermodynamic efficiency of combined cycles.

UNIT-III:

NUCLEAR POWER PLANTS: Principles of nuclear energy, basic nuclear reactions, nuclear reactors-PWR, BWR, CANDU, Sodium graphite, fast breeder, homogeneous; gas cooled. Advantages and limitations, nuclear power station, waste disposal. Power Plant Economics: load curve, different terms and definitions, cost of electrical energy, tariffs methods of electrical energy, performance & operating characteristics of power plants- incremental rate theory, input-output curves, efficiency, heat rate, economic load sharing.

UNIT-IV:

NON-CONVENTIONAL POWER GENERATION: Solar radiation estimation, solar energy collectors, low, medium & high temperature power plants, OTEC, wind power plants, tidal power plants, geothermal power plants.

UNIT-V:

DIRECT ENERGY CONVERSION SYSTEMS: Fuel cell, MHD power generation-principle, open & closed cycle's systems, thermoelectric power generation, thermionic power generation.

TEXTBOOKS:

1. Power station Engineering and Economy by Bernhardt G.A. skrotzki and William A. Vopat – Tata Mc GrawHill Publishing Campany Ltd., New Delhi
2. Power Plant Engineering: P.K. Nag Tata McGraw Hill second Edition 2001.
3. A Course in Power Plant Engineering: / Arora and S. Domkundwar/ Dhanpat Rai Publisher
4. Power Plant Engineering / P.C.Sharma / S.K.Kataria Publisher
5. A Text Book of Power Plant Engineering / R.K.Rajput / Laxmi Publications

REFERENCE BOOKS:

1. Power Plant Engineering/ P.K.Nag II Edition /TMH Publishers
2. An Introduction to Power Plant Technology / G.D. Rai/Khanna Publishers
3. Power plant Engg /Elanchezhian/I.K. International Publishers

COURSE OUTCOMES:

At the end of the course the students will be able

- To Study various non-conventional sources in remote areas of the country.
- Students get the exposure of different power plants.
- To analyze the thermionic power generation.

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(R18A0287) POWER SYSTEMS LAB

COURSE OBJECTIVES:

- To perform testing of CT, PT's and Insulator strings.
- To find sequence impedances of 3-Φ synchronous machine and Transformer.
- To perform fault analysis on Transmission line models and Generators.

Part – A

The following experiments are required to be conducted compulsory experiments:

1. Characteristics of IDMT over Current Relay.
2. Differential protection of 1-Φ transformer.
3. Characteristics of Micro Processor based Over Voltage/Under Voltage relay.
4. Testing of CT, PT's and Insulator strings.
5. ABCD constants and Regulation of a 3-Φ transmission line model.
6. Power circle diagrams of a 3-Φ transmission line model.

Part – B

In addition to the above experiments, at least any four of the experiments from the following list are required to be conducted.

1. Formation of YBUS.
2. Load Flow Analysis using Gauss Seidal (GS) Method.
3. Load Flow Analysis using Newton's Raphson (NR) Method
4. Load Flow Analysis using Fast Decoupled (FD) Method.
5. Formation of ZBUS.
6. LG, LL and 3-Φ fault analysis of 3-Φ synchronous machine.
7. Transient Stability Analysis for Single Machine connected to Infinite Bus by Point by Point method.

COURSE OUTCOMES:

After completion of this lab, the student will be able to

- Perform various load flow techniques
- Understand Different protection methods
- Analyze the experimental data and draw the conclusions.

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(R18A0288) ELECTRICAL MEASUREMENTS LABORATORY

COURSE OBJECTIVES:

- To calibrate LPF Watt Meter, energy meter, P.F Meter using electro dynamo meter type instrument as the standard instrument.
- To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A.C Bridges.
- To determine three phase active & reactive powers using single wattmeter method practically.
- To determine the ratio and phase angle errors of current transformer and potential transformer.

PART - A

The following experiments are required to be conducted compulsory experiments:

1. Calibration and Testing of single phase energy Meter
2. Measurement of tolerance of batch of low resistances by Kelvin's double bridge
3. Measurement of voltage, current and resistance using dc potentiometer
4. Schering Bridge and Anderson bridge.
5. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
6. Calibration of LPF wattmeter by Phantom testing
7. Calibration of dynamometer type power factor meter.
8. Measurement of reactive power using single wattmeter in three-phase circuit.

PART – B

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list

1. Measurement of Displacement with the help LVDT
2. Measurement of different ranges of temperatures using i) RTD ii) Thermo couple
3. Measurement of voltage, frequency &phase with the help of CRO
4. Measurement of load with the help of strain gauges
5. Measurement of % ratio error and phase angle of given C.T. by Silsbee's method.
6. Dielectric testing of transformer oil
7. Measurement of Iron loss in a bar specimen using Epstein square

COURSE OUTCOMES:

After completion of this course the student is able to:

- Get the ability to choose instruments and can test any instrument can find the accuracy of any instrument by performing experiment can calibrate PMMC instrument using D.C potentiometer.

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(R18A0465) PLC SYSTEMS

COURSE OBJECTIVES:
For programmable logic controllers & embedded systems, the course will enable the students

- To provide and ensure a comprehensive understanding of using advanced controllers in measurement and control instrumentation.
- To analyze Programmable Logic Controller (PLC), IO Modules and internal features, Programming in Ladder Logic.
- Understand the core of an embedded system
- To learn the design process of embedded system applications.
- To understands the RTOS and inter-process communication.
- To understand different communication interfaces.

UNIT-I:
PLC BASICS: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules. PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

UNIT-II:
LADDER DIAGRAMS FOR PROCESS CONTROL: Ladder diagrams and sequence listings, ladder diagram construction and flowchart for spray process system.
PLC REGISTERS: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

UNIT-III:
INTRODUCTION TO EMBEDDED SYSTEMS: Complex systems and microprocessors-embedding computers, characteristics of embedded computing applications, challenges in embedded computing system design, performance in embedded computing; The embedded system design process-requirements, specification, architecture design, designing hardware and software, components, system integration.

UNIT-IV:
TYPICAL EMBEDDED SYSTEM: Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTS; Memory-ROM, RAM, memory selection for embedded systems; Sensors and actuators , Onboard communication interfaces-I2C, SPI.
EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT-V:

RTOS BASED EMBEDDED SYSTEM DESIGN: Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling, How to choose an RTOS.

TEXT BOOKS:

1. Programmable Logic Controllers- Principles and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI.
2. Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
3. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Programmable Logic Controllers- Programming Method and Applications by JR.Hackworth and F.D Hackworth Jr., Pearson, 2004.
2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.

COURSE OUTCOMES:

After going through this course the student will be able to

- Describe the main functional units in a PLC and be able to explain how they interact
- Develop ladder logic programming for simple process.
- Understand and design the embedded systems
- Understand Embedded Firmware design approaches
- Learn the basics of RTOS

PROFESSIONAL ELECTIVE - V

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IV B.Tech EEE II SEM

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(PROFESSIONAL ELECTIVE - V)
(R18A0224) INDUSTRIAL AND ALLIED ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To give a basic knowledge on residential, commercial and wiring systems.
- To understand the different applications like heating, welding and illumination.
- To gives a comprehensive idea on UPS, Electric Traction and industrial electrical systems.
- Introduce various methods of effectively and efficiently utilizing Electrical Energy for different and desired applications
- Teach the various Electrical Lighting principles and their applications.

UNIT - I

ILLUMINATION: Introduction, terms used in illumination, laws of illumination, polar curves, photometry. Sources of light Discharge lamps: Mercury Vapor and Sodium Vapor lamps – comparison between tungsten filament lamps and fluorescent lamps. Basic principles of light control, Types and design of lighting and flood lighting.

UNIT - II

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS: Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthing for commercial installations. Selection and sizing of components.

UNIT - III

ELECTRIC HEATING AND WELDING: Electric Heating: Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating. Electric welding: resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT - IV

INDUSTRIAL ELECTRICAL SYSTEMS: Industrial loads, motors, starting of motors, Lightning Protection, methods of earthing, UPS System, Electrical Systems for the elevators, Battery banks, Selection of UPS and Battery Banks.

UNIT - V

ELECTRIC TRACTION: Traction Systems: types, overview of existing electric traction systems in India. Special features of traction motor. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves. Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. J.B. Gupta, "Utilization of Electric Power and ElectricTraction", Kataria & Sons publishers, Delhi, IX Edtion, 2004.
2. C.L. Wadhwa, "Generation, Distribution and Utilization of electrical Energy", New Age International (P) Limited Publishers, 3rd Edition, 2010
3. S. L.Uppal and G.C.Garg," Electrical wiring Estimating & costing" Khanna publishers,2008
4. Utilization of electric Energy by E. Openshaw Taylor, Orient Longman Private Limited,1971.

REFERENCE BOOKS:

1. N.V. Suryanarayana, "Utilization of Electrical Power including Electric drives and Electric traction", New Age International (P) Limited Publishers, 1st Edition, 1994.
2. E. Open Shaw Taylor, "Utilization of Electric Energy", Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

- Maintain/Troubleshoot various lamps and fittings in use.
- Understand various types of Heating, Welding and traction system.
- Design Illumination systems for various applications.
- Application of electrical equipment's in different types of industries
- Work in the areas of UPS systems and traction systems production, commissioning and maintenance.

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(PROFESSIONAL ELECTIVE - V)
(R18A0225) POWER SYSTEM DYNAMICS AND STABILITY

COURSE OBJECTIVES:

- To remember the dynamic characteristics of power system equipment,
- To recognize dynamic performance of power systems
- To illustrate the system stability and controls.

UNIT – I:
INTRODUCTION: General basic concept of Power System Stability, States of operation & System Security, System Dynamics Problems, Review of Classical Model, System Model, Analysis of Steady State Stability & Transient Stability

UNIT –II:
MODELLING OF SYNCHRONOUS MACHINE: Synchronous Machine, Park's Transformation, Analysis of Steady State Performance, P. U. Quantities, Equivalent Circuit of Synchronous Machine

UNIT –III:
EXCITATION SYSTEMS & PRIME MOVER CONTROLLERS: Simplified Representation of Excitation Control, Excitation systems, Modeling, Block Diagram, State Equations, Prime Mover Control System, Transmission Line & Load Modeling

UNIT –IV:
DYNAMICS OF SYNCHRONOUS GENERATOR CONNECTED TO INFINITE BUS: System Model, Synchronous Machine Model, System Simulation, Consideration of other Machine Models including SVC Model

UNIT –V:
SMALL SIGNAL STABILITY:-Single and multi-machine system, Damping and Synchronizing torque Analysis, Power System Stabilizers Transient Stability and Voltage Stability controllers. Voltage Stability: Introduction, affecting factors, analysis, comparison with angle stability

TEXT BOOKS:
1. K. R. Padiyar, Power System Dynamics – Stability & Control, BS Publications
2. I.J. Nagrath and M. Gopal, Control system engineering, Wiley Eastern Ltd, 3rd edition, 2000.

REFERENCE BOOKS:
1. Benjamin C. Kuo, Automatic Control system, Prentice Hall of India Pvt Ltd. 2Prabha Kundur, Power System Stability and Control, Tata McGraw Hill
2. Power System Dynamics and Stability by Jan Machowski, Janusz Bialek, James RichardBumby, Dr Jim Bumby

COURSE OUTCOMES:

Upon the completion of the subject, the student will be able to

- Choose the fundamental dynamic behavior and controls of power systems to perform basic stability analysis.
- Comprehend concepts in modeling and simulating the dynamic phenomena of power systems Interpret results of system stability studies
- Analyze theory and practice of modeling main power system components, such as synchronous machines, excitation systems and governors

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IV B.Tech EEE II SEM

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(PROFESSIONAL ELECTIVE - V)
(R18A0226) ELECTRICAL MACHINE DESIGN

COURSE OBJECTIVES:

- To understand basic design aspects of static and rotating electrical machines.
- To understand the design concepts, pertaining to dimensions, materials, winding configurations, cooling systems etc.
- To understand and appreciate the major design aspects pertaining to temperature ratings efficiency etc.

UNIT – I:
INTRODUCTION TO ELECTRICAL MACHINE DESIGN: Design concepts, factors, Material selection, manufacturing techniques, Review of basic principles, Heating, cooling techniques

UNIT – II:
CONSTRUCTIONAL DETAILS OF MACHINES (DC & AC): Constructional details – output equation – Choice of specific electric and magnetic loadings – Separation of D and L for rotating machines. Estimation of number of conductors / turns – coils – armature Slots – Conductor dimension, Slot dimension, Choice of number of poles – Length of air gap – Design of field system, Interpoles, Commutator and Brushes.

UNIT – III
TRANSFORMERS: Construction –Core and Yoke Design – cross section, cooling of transformers, Number of tubes ,Transformer windings, Coil design, output equation , determination of number of turns and length of mean turn of winding, Resistance, Leakage reactance no load current calculation, losses and efficiency.

UNIT – VI
INDUCTION MOTORS: Choice of specific electric and magnetic loadings, Stator design (Frames), output equation, choice of conductor rating, stator winding, and stator slots. Squirrel cage rotor design – air gap length, rotor slots and rotor bars. Design of wound rotor – rotor slots, windings, short circuit (blocked rotor currents)

UNIT – V
SYNCHRONOUS MACHINES: Constructional features – short circuit ratio – output equation – specific loadings – main dimensions – Stator design – design of Salient pole field coil.

TEXT BOOKS:

1. " Electrical machine design" – A.K Sawhney, Dhanpath Rao

REFERENCE BOOKS:

1. Performance and Design of DC machines, Clayton & Hancock, ELBS
2. Performance and Design of AC machines, M.G. Say, Pitman, ELBS

COURSE OUTCOMES:

Upon completing the course students will be able to:

- Understand the design aspects of various parts of DC machines and solve the problems of design
- Student should be able to understand the design concepts of transformers and know about how to design the parts.
- Student is able to understand the design concepts of synchronous machines and solve the problems related to design.
- Student understands the importance of design of machines based on their applications.

PROFESSIONAL ELECTIVE - VI

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IV B.Tech EEE II SEM

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(PROFESSIONAL ELECTIVE - VI)
(R18A0227) POWER QUALITY AND FACTS DEVICES

COURSE OBJECTIVES:

To study

- The various power quality issues in Distribution systems.
- The objectives of Shunt and Series Reactive Power compensation.
- The importance of controllable parameters and types of FACTS controllers & their benefits.
- STATCOM & SVC and their comparison. Regulation of STATCOM, Functioning and control of GCSC, TSSC and TCSC.

UNIT-I

POWER QUALITY PROBLEMS IN DISTRIBUTION SYSTEMS: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions. Wave-form Distortions: Harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement.

UNIT-II

TRANSMISSION LINES AND SERIES/SHUNT REACTIVE POWER COMPENSATION: Basics of AC Transmission. Analysis of uncompensated AC transmission lines. Passive Reactive Power Compensation. Shunt and series compensation at the mid-point of an AC line. Comparison of Series and Shunt Compensation.

UNIT-III

STATIC SHUNT COMPENSATORS: Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR Compensator-its characteristics, TCR, TSC, FC-TCR configurations, STATCOM
- basic operating principle, control approaches and characteristics.

UNIT-IV

STATIC SERIES COMPENSATORS: Objectives of series compensator, variable impedance type of series compensators, TCSC, TSSC- Operating principles and control schemes, SSSC, Power Angle characteristics, Control range and VAR rating, Capability to provide reactive power compensation, external control.

UNIT-V

COMBINED COMPENSATORS: Introduction to Unified Power Flow Controller, Basic operating principles, Conventional control Capabilities, Independent control of real and reactive power.

TEXT BOOKS:

1. Electrical Power Systems Quality, Dugan Roger C. Santoso Surya, Mc Granaghan, Marks F.Beaty and H. Wayre, Mc Graw Hill.
2. Power Systems Quality Assessment, J.Arillaga, N.R.Watson, S.Clon, John Wiley.

3. “Understanding FACTS –Concepts and Technology of Flexible AC Transmission Systems” Narain G. Hingorani, Laszlo Gyugyi.

REFERENCE BOOKS:

1. Power Quality, C. Sankaran, CRC Press 4. Understanding power quality problems, Math H. Bollen, IEEE press.
2. A.T.John, “Flexible AC Transmission System”, Institution of Electrical and Electronic Engineers (IEEE), 1999.

COURSE OUTCOMES:

After completion of this course, the student will be able to:

- Know the severity of power quality problems in distribution system and understand the concept of voltage sag transformation from up-stream (higher voltages) to downstream (lower voltage).
- Understand the Concept of improving the power quality to sensitive load by various mitigating custom power devices.
- Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping.
- Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC.

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(PROFESSIONAL ELECTIVE - VI)

(R18A0228) POWER SYSTEM RELIABILITY

COURSE OBJECTIVES:

To study and understand:

- Concepts of probability theory
- Systems Modelling and Evaluation of Reliability with different methods
- Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes
- Concepts of multi Component & Approximate System Reliability Evaluation

UNIT-I

BASIC PROBABILITY THEORY: Basic concepts – Rules for combining Probabilities of events – Failure Density and Distribution functions – Bernoulli's trials – Binomial distribution – Expected value and standard deviation for binomial distribution – Examples.

UNIT-II

NETWORK MODELING AND RELIABILITY EVALUATION: Basic concepts – Evaluation of network Reliability / Unreliability – Series systems, Parallel systems, Series - Parallel systems, partially redundant systems – Types of redundancies - Evaluation of network Reliability / Unreliability using conditional probability method – Paths based and Cut set based approach – complete event tree and reduced event tree methods -Examples.

UNIT-III

TIME DEPENDENT PROBABILITY: Basic concepts – Reliability functions f(t), F(t), R(t), h(t) – Relationship between these functions – Baths tubs curve – Exponential failure density and distribution functions - Expected value and standard deviation of Exponential distribution – Measures of reliability – MTTF, MTTR, MTBF – Evaluation of network reliability / Unreliability of simple Series, Parallel, Series-Parallel systems - Partially redundant systems - Evaluation of reliability measure – MTTF for series and parallel systems –Examples.

UNIT-IV

DISCRETE MARKOV CHAINS & CONTINUOUS MARKOV PROCESSES: Basic concepts – Stochastic transitional Probability matrix – time dependent probability evaluation – Limiting State Probability evaluation – Absorbing states – Markov Processes-Modelling concepts – State space diagrams – time dependent reliability evaluation of single component repairable model – Evaluation of Limiting State Probabilities of one, two component repairable models – Frequency and duration concepts – Frequency balance approach - Examples.

UNIT-V

MULTI COMPONENT & APPROXIMATE SYSTEM RELIABILITY EVALUATION: Recursive relation for evaluation of equivalent transitional rates, cumulative probability and cumulative frequency and 'n' component repairable model - Series systems, Parallel systems, Basic reliability indices – Cutset approach – Examples.

TEXT BOOK:

1. System Reliability Concepts by V. Sankar, Himalaya Publishing House, 2015.

REFERENCE BOOKS:

1. Reliability Evaluation of Engineering Systems by Roy Billinton and Ronald N. Allan, Reprinted in India B. S. Publications, 2007.
2. Reliability Engineering by E. Balagurusamy, Tata McGraw Hill, 2003.
3. Reliability and Maintainability Engineering by Charles E. Ebeling, Tata McGraw Hill, 2000.
4. Probability concepts in Electric Power system – G.J.Anders- 1st edition –1990 – John wiley &sons.

COURSE OUTCOMES:

At the end of the course students will be able to:

- Apply the Concepts of probability theory for Systems Modelling and Evaluation of Reliability in different methods
- Apply the Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes in establishing the reliability figure of practical systems
- Carry out multi Component & Approximate System Reliability Evaluation

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(PROFESSIONAL ELECTIVE - VI)
(R18A0229) ELECTRICAL AND HYBRID VEHICLES

COURSE OBJECTIVES:

- To understand the models, describe hybrid vehicles and their performance.
- To understand the different possible ways of energy storage.
- To understand the different strategies related to hybrid vehicle operation &energy management.

UNIT 1:

INTRODUCTION: Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, and mathematical models to describe vehicle performance.

UNIT 2:

INTRODUCTION TO HYBRID ELECTRIC VEHICLES: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

UNIT 3:

ELECTRIC TRAINS: Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis. Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

UNIT 4:

ENERGY STORAGE: Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. Sizing the drives system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems

UNIT 5:

ENERGY MANAGEMENT STRATEGIES: Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies and implementation issues of energy management strategies.

TEXT BOOKS:

1. C. Mi, M. A. Masrur and D. W. Gao, “Hybrid Electric Vehicles: Principles andApplications with PracticalPerspectives”, John Wiley & Sons, 2011.
2. S. Onori, L. Serrao and G. Rizzoni, “Hybrid Electric Vehicles: Energy Management Strategies”, Springer, 2015.

REFERENCE BOOKS:

1. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, “Modern Electric, Hybrid Electric, and FuelCell Vehicles: Fundamentals, Theory, and Design”, CRC Press, 2004.
2. T. Denton, “Electric and Hybrid Vehicles”, Routledge, 2016

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

- Study the models to describe hybrid vehicles and their performance.
- Implementthe different possible ways of energy storage.
- Adopt the different strategies related to hybrid vehicle operation & energy management.



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BACHELOR OF TECHNOLOGY

INFORMATION TECHNOLOGY

Course Structure & Syllabus
(Batches admitted from the academic year 2018 - 2019)

Note: The regulations here under are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ‖Autonomous Institution /College‖ means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

- ‒Academic Autonomy‖ means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

- ‒Commission‖ means University Grants Commission.

- ‒AICTE‖ means All India Council for Technical Education.

- ‒University‖ the Jawaharlal Nehru Technological University, Hyderabad.

- ‒College‖ means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

- ‒Program‖ means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech

- ‒Branch‖ means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.

- ‒Course‖ or ‒Subject‖ means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to thesociety.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

“A thought beyond the horizons of success committed for educational excellence”

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – _A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website:www.mrcet.ac.in

VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE STRUCTURE

I Year B. Tech (IT) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0001	English	2	-	-	2	30	70
2	R18A0021	Mathematics – I	4	1	-	4	30	70
3	R18A0013	Applied Physics	3	-	-	3	30	70
4	R18A0301	Engineering Graphics	1	-	4	3	30	70
5	R18A0501	Programming For Problem Solving	3	-	-	3	30	70
6	R18A0082	Engineering/IT Workshop	-	-	4	2	30	70
7	R18A0581	Programming For Problem Solving Lab	-	-	3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-	-	3	1.5	30	70
TOTAL			**13**	**01**	**14**	**20**	**240**	**560**

I Year B. Tech (IT) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0002	Professional English	2	-	-	2	30	70
2	R18A0022	Mathematics – II	4	1	-	4	30	70
3	R18A0012	Engineering Chemistry	3	-	-	3	30	70
4	R18A0502	Object Oriented Programming	3	-	-	3	30	70
5	R18A0201	Basic Electrical Engineering	3	-	-	3	30	70
6	R18A0083	Engineering Physics/Chemistry Lab	-	-	4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-	-	3	1.5	30	70
8	R18A0281	Basic Electrical Engineering Lab	-	-	3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2	-	-	0	100	-
TOTAL			**17**	**01**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B.Tech (IT) - I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX MARKS	
							INT	EXT
1	R18A1201	Computer Organization and Architecture	3	0	0	3	30	70
2	R18A0503	Data Structures	3	0	0	3	30	70
3	R18A0504	Operating Systems	3	0	0	3	30	70
4	R18A0506	Discrete Mathematics	3	0	0	3	30	70
5	R18A0024	Probability and Statistics	3	0	0	3	30	70
6	R18A0461	Analog and Digital Electronics	3	0	0	3	30	70
7	R18A0583	Operating Systems Lab	0	0	3	1.5	30	70
8	R18A0584	Data Structures Lab	0	0	3	1.5	30	70
9*	R18A0004	Foreign Languages : French	2	0	0	-	100	-
TOTAL			**20**	**0**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B.Tech (IT) - II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX MARKS	
							INT	EXT
1	R18A0511	Software Engineering	3	0	0	3	30	70
2	R18A1202	Automata and compiler design	3	0	0	3	30	70
3	R18A0509	Java Programming	3	0	0	3	30	70
4	R18A0510	Database Management Systems	3	0	0	3	30	70
5	****	Open Elective - 1	3	0	0	3	30	70
6	R18A0061	Managerial Economics and Financial Analysis	3	0	0	3	30	70
7	R18A0585	Java Programming Lab	0	0	3	1.5	30	70
8	R18A0586	Database Management Systems Lab	0	0	3	1.5	30	70
9	R18A0014	Environmental Sciences	2	0	0	-	100	-
TOTAL			**20**	**0**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B.Tech (IT) - I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX MARKS	
							INT	EXT
1	R18A0507	Design and Analysis of Algorithms	3	0	0	3	30	70
2	R18A0513	Python Programming	3	0	0	3	30	70
3	R18A0517	Web Technologies	3	0	0	3	30	70
4	R18A0464	Embedded Systems	3	0	0	3	30	70
5	R18A1203 R18A0519 R18A1205	Professional Elective 1: 1. Knowledge Management 2. Computer Graphics 3. Artificial Intelligence	3	0	0	3	30	70
6		Open Elective - 2	3	0	0	3	30	70
7	R18A0588	Python Programming Lab	0	0	3	1.5	30	70
8	R18A0589	Web Technologies Lab	0	0	3	1.5	30	70
9*	R18A0006	Technical Communication and Soft Skills	2	0	0	-	100	-
TOTAL			**20**	**0**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B.Tech (IT) - II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX MARKS	
							INT	EXT
1	R18A0518	Computer Networks	3	0	0	3	30	70
2	R18A0524	Data Warehousing and Data Mining	3	0	0	3	30	70
3	R18A0525	Linux Programming	3	0	0	3	30	70
4	R18A0520 R18A0521 R18A0527	Professional Elective 2: 1.Distributed Systems 2.Cyber Security 3. Mobile Computing	3	0	0	3	30	70
5		Open Elective - 3	3	0	0	3	30	70
6	R18A1284	Mini Project	0	0	6	3	30	70
7	R18A1281	Data Warehousing and Data Mining Lab	0	0	3	1.5	30	70
8	R18A0590	Linux Programming Lab	0	0	3	1.5	30	70
9*	R18A0007	Constitution of India	2	-	-	0	100	-
TOTAL			**17**	**0**	**12**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

IV Year B.Tech (IT) - I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX MARKS	
							INT	EXT
1	R18A1206	Programming for Application Development	3	0	0	3	30	70
2	R18A1207	Mobile Application Development	3	0	0	3	30	70
3	R18A0523	Cloud Computing	3	0	0	3	30	70
4	R18A1208	Business Data Analytics	3	0	0	3	30	70
6	R18A0526 R18A0531 R18A0522	Professional Elective 3: 1. Machine Learning 2. Internet of Things 3. Software Testing Methodologies	3	0	0	3	30	70
6	R18A1282	Programming for Application Development Lab	0	0	3	1.5	30	70
7	R18A1283	Mobile Application Development Lab	0	0	3	1.5	30	70
8	R18A1285	Project-1	0	0	6	3	30	70
TOTAL			**15**	**0**	**12**	**21**	**240**	**560**

IV Year B.Tech (IT) - II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX MARKS	
							INT	EXT
1	R18A1209	Tools and Techniques of Data Sciences	3	0	0	3	30	70
2	R18A0535 R18A1210 R18A0528	Professional Elective 4: 1. Image Processing 2. Adhoc and Sensor Networks 3.Service Oriented Architecture	3	0	0	3	30	70
3	R18A1211 R18A0534 R18A1212	Professional Elective 5: 1. Advanced Databases 2. Block Chain Technology 3. Middleware Technologies	3	0	0	3	30	70
4	R18A1286	Project - 2	0	0	12	6	60	140
TOTAL			**09**	**0**	**12**	**15**	**150**	**350**

OPEN ELECTIVE – 1

S.NO	SUBJECT CODE	SUBJECT
1	R18A0451	DIGITAL ELECTRONICS
2	R18A0551	DATA BASE SYSTEMS
3	R18A0553	DATA STRUCTURES USING PYTHON
4	R18A0351	INTELLECTUAL PROPERTY RIGHTS
5	R18A0352	GREEN ENERGY SYSTEMS
6	R18A0555	DATA VISUALIZATION

OPEN ELECTIVE – 2

S.NO	SUBJECT CODE	SUBJECT
1	R18A1251	MANAGEMENT INFORMATION SYSTEMS
2	R18A0552	INTRODUCTION TO JAVA PROGRAMMING
3	R18A1252	SOFTWARE PROJECT MANAGEMENT
4	R18A0353	ENTERPRISE RESOURCE PLANNING
5	R18A0354	NANO TECHNOLOGY

OPEN ELECTIVE – 3

S.NO	SUBJECT CODE	SUBJECT
1	R18A0452	ROBOTICS & AUTOMATION
2	R18A0453	INTERNET OF THINGS & ITS APPLICATIONS
3	R18A1253	SOFTWARE TESTING TECHNIQUES
4	R18A0355	TOTAL QUALITY MANAGEMENT
5	R18A0251	ELECTRICAL SYSTEMS & APPLICATIONS
6	R18A0554	OPERATING SYSTEM CONCEPTS

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -IT **LT/P/DC**

2- / - / - 2

(R18A0001) ENGLISH

OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing to ensure error-free writing.
4. To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
5. To expose students to various techniques of reading skills which hone their comprehensive skills.

UNIT –I

Chapter entitled ‗**The Road Not Taken**‖ by Robert Frost
Grammar –Tenses and Punctuation (Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations) Reading – Techniques for effective reading-Reading Exercise –Type 1

UNIT – II

Chapter entitled ‗**Abraham Lincoln's Letter to His Son's Teacher**‖ Grammar – Voices, Transitive and Intransitive Verbs Vocabulary – Synonyms, Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies). Reading– Skimming, scanning- Reading Exercise –Type 2

UNIT – III

Chapter entitled ‗**War**‖ by L. Pirandello
Grammar –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing – Essay Writing (Introduction, body and conclusion) Reading – Comprehension- Reading Exercise – Type 3

UNIT – IV

Chapter entitled ‗**J K Rowling's Harvard Speech**‖ Grammar – Articles, Misplaced Modifiers Vocabulary – One-Word Substitutes
Writing – Précis Writing
Reading – Intensive and Extensive reading - Reading Exercise – Type 4

UNIT –V

Sentence Structures (phrases and clauses)

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading – Identifying Errors - Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

OUTCOMES:

Students will be able to:

1. Write formal or informal letters and applications for different purposes.
2. Select and extract relevant information through skimming and scanning.
3. Utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
4. Draft concise emails following professional email etiquette.
5. Enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM – IT **L T/P/D C**

4 1/-/- 4

(R18A0021) MATHEMATICS -I

OBJECTIVES:

To learn

1. The concept of rank of a matrix which is used to know the consistency of system of linear equations and also to find the eigen vectors of a given matrix.
2. Finding maxima and minima of functions of several variables.
3. Applications of first order ordinary differential equations. (Newton‘s law of cooling, Natural growth and decay)
4. How to solve first order linear, non linear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
5. Solving differential equations using Laplace Transforms.

UNIT I:

Matrices

Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:

Functions of Several Variables

Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor‘s theorem for two variables.

UNIT III:

Ordinary Differential Equations

First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton‘s law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type $f(x) = e^{ax}$, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV:

Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange‘s linear equation and non-linear equations, Charpit‘s method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V:

Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by $-t$, Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by s, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2. Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .
3. Engineering Mathematics by N.P Bali and Manish Goyal.

OUTCOMES:

After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first and higher order differential equations.
4. Solve first order linear and non-linear partial differential equations.
5. Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH – I YEAR – I SEM – IT **L T/P/D C**

3 -/-/- 3

(R18A0011) APPLIED PHYSICS

OBJECTIVES:

1. To understand dual nature of the matter and behavior of a particle quantum mechanically.
2. To understand band structure of the solids and classification of materials.
3. To be able to distinguish pure, impure semiconductors and characteristics of PN junction diode.
4. To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
5. To be able to distinguish ordinary light with a laser light and realize the transfer of light through optical fibers.

UNIT – I

QUANTUM MECHANICS

Wave nature of particles, deBroglie‘s hypothesis, matter waves, Heisenberg‘s uncertainty principle, Davisson and Germer‘s experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – II

ELECTRONIC MATERIALS

Free electron theory, Fermi level, Density of states, Periodic potential-Bloch‘s theorem, Kronig – Penny modal, E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials on the basis of energy bands: Metals, semi conductors and insulators.

UNIT – III

SEMICONDUCTOR

PHYSICS

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semi conductors, Carrier concentration in intrinsic and extrinsic semi conductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT-IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT – V:

LASERS & FIBER OPTICS

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, types of pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Attenuation, Optical Fiber in Communication System, Applications of optical fibers.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

OUTCOMES:

After completion of studying Applied Physics the student is able to,

1. Know the basic principles of quantum mechanics and the importance of behavior of a particle.
2. Realize the importance of band structure of solids and their applications in various electronic devices.
3. Learn concentration estimation of charge carriers in semiconductors and working principles of PN diode.
4. Learn dielectric, magnetic properties of the materials and apply them in material technology.
5. Learn the principles and production of LASER beams and transfer of information by optical fiber communication systems.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- IT **L T/P/D C**

1 -/4-/- 3

(R18A0301) ENGINEERING GRAPHICS

Course Objectives:

1. Learn to sketch and take field dimensions.
2. Learn to take data and transform it into graphic drawings.
3. Learn basic engineering drawing formats

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both

planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids.

UNIT – V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

Course Outcomes:

1. Student's ability to convert sketches to engineered drawings will increase.
2. Students will be able to draw orthographic projections and sections.
3. Student's ability to perform basic sketching techniques willimprove.

TEXTBOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
2. Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- IT **L T/P/D C**

3 -/-/- 3

(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

OBJECTIVES

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C to solve problems.

UNIT - I

Introduction to Computing – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

Statements-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

Functions-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

Arrays- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

Strings- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

Pointers- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

Structures- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in C, Ashok Kamthane. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.

OUTCOMES:

1. Demonstrate the basic knowledge of computer hardware and software.
2. To formulate simple algorithms for arithmetic and logical problems.
3. To translate the algorithms to programs (in C language).
4. To test and execute the programs and correct syntax and logical errors.
5. Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- IT **L T/P/D C**

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(R18A0082) ENGINEERING WORKSHOP/ IT WORKSHOP

OBJECTIVES:

1. Student able to learn about different tools used in the lab
2. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student able to learn about different Carpentry and Fitting tools

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry
5. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

OUTCOMES:

1. Students can understand different machine shop operations
2. Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student learned about metal cutting processes

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(R18A0082) IT WORKSHOP LAB

OBJECTIVES:

1. The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point
2. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.
3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.
4. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.
5. HTML introduction for creating static web pages

PC HARDWARE

Week 1:
Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:
Assembling and disassembling of PC

Week 3:
Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4: Hardware Troubleshooting
Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS
WeB Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the

websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.
Header and Footer
Bullets and Numbering
Drawing Toolbar: Auto shapes, Textboxes,
etc Design Template
Introduction to custom animation.

b) Create a presentation to conduct a creativity session using the following tools:

1. Slide transition
2. Master slide view
3. Insert picture – clipart, image
4. Action button
5. Drawing tool bar – lines, arrows
6. Hyperlink

7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

TEXT BOOKS:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage‘s using HTML.

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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

OBJECTIVES:

1. Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.
6. Programming using gcc compiler in Linux.

Week 1:

a) Write a C program to find sum and average of three numbers.
b) Write a C program to find the sum of individual digits of a given positive integer.

Week 2:

a) Write a C program to generate the first n terms of the Fibonacci sequence.
b) Write a C program to generate prime numbers from 1 to n.
c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:

a) Write a C program to check whether given number is perfect number or not.
b) Write a C program to check whether given number is strong number or not.

Week 4:

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to perform arithmetic operations using switch statement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursive function.
b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.
b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program to Sort the Array in an Ascending Order
c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.

b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.

b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

Week 12:

a) Write C program to count the number of lines, words and characters in a given text.

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V.RAjaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N Venkateswarlu and E.V.Prasad,S.Chand Publishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

OUTCOMES:

1. Acquire knowledge about the basic concept of writing a program.
2. Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3. Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
4. Understand the Role of Functions involving the idea of modularity.
5. Understand the Concept of Array and pointers dealing with memory management.
6. Learn Structures and unions through which derived data types can be formed.

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(R18A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

OBJECTIVES:

1. To expose students to a variety of self-instructional, learner-friendly modes of language learning
2. To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
3. To enable students to overcome public speaking anxiety and equip them to become employable.
4. To familiarize students with formal telephonic expressions by means of appropriate tone.
5. To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I

CALLLab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants-Transcriptions

ICS Lab: Ice-Breaking Activity - JAM Session- Greetings – Taking Leave – Introducing Oneself and Others.

UNIT –II

CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation

ICS Lab: Situational Dialogues/Role Plays - Making Requests and Seeking Permissions.

UNIT –III

CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)

ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IV Processor
   a) Speed –2.8 GHZ
   b) RAM –512 MB Minimum
   c) HardDisk –80 GB
ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

OUTCOMES:

Students will be able to:

1. understand the importance of learning phonetics.
2. learn how to pronounce words using phonetic transcription.
3. know the importance of speaking English with rhythm and intonation.
4. effectively participate in JAM session.
5. use polite expressions in all formal situations.
6. effectively communicate through telephone.

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(R18A0002) PROFESSIONAL ENGLISH

OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I

Listening - Bill Gate‘s TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects and Persons
Grammar - Finite and Non-finite verbs
Vocabulary - Business
Vocabulary Writing -
Paragraph Writing

Unit –II

Listening - Google CEO Sundar Pichai‘s Speech I/O 2017
Keynote Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

Unit –III

Listening - Sample Interviews
(videos) Speaking - Mock Interviews
Grammar - Direct and Indirect Speech
Vocabulary - Standard Abbreviations (Mini
Project) Writing - Job applications I (Cover Letter)

Unit – IV

Listening - Telephonic Interviews
Speaking - Telephonic
Expressions Grammar - Auxiliary
verbs Vocabulary - Word Analogy-I
Writing - Job Application II (Resume)

Unit – V

Listening - Tanmay Bhakshi‘s ITU
interview Speaking - Professional Etiquette

Grammar - Common Errors
Vocabulary - Word Analogy-II
Writing - Report Writing
* Exercises apart from the text book shall also be referred for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford UniversityPress

OUTCOMES:

Students will be able to:

1. draft coherent and unified paragraphs with adequate supporting details.
2. demonstrate problem solving skills, decision-making skills, analytical skills.
3. comprehend and apply the pre-interview preparation techniques for successful interview.
4. achieve expertise in writing resume and cover letter formats.
5. understand the steps of writing _Reports and Abstract‘.

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(R18A0022) MATHEMATICS-II

OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
2. To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
3. Evaluation of improper integrals using Beta and Gamma functions.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I:

Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton‘s formulae for interpolation, Gauss‘s central difference formulae. Interpolation with unevenly spaced points - Lagrange‘s Interpolation.

UNIT – II:

Numerical Methods

Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson‘s $1/3^{rd}$ and Simpson‘s $3/8^{th}$ rules.

Numerical solution of ordinary differential equations: Solution by Taylor‘s series method, Euler‘s method, Euler‘s modified method, Runge-Kutta fourth order method.

Curve fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III:

Beta and Gamma functions

Introduction of improper integrals- Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV:

Double and Triple Integrals

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V:

Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green‘s Theorem, Stoke‘s theorem and Gauss‘s Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

OUTCOMES:

After learning the contents of this paper the student must be able to

1. Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
2. Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3. Find a numerical solution for a given differential equation.
4. Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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(R18A0013) ENGINEERING CHEMISTRY

OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
2. To analyze microscopic chemistry in terms of atomic and molecular orbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
5. To analyze different types of fuels and their applications in various engineering fields.

UNIT-I:

Electrochemistry and Corrosion

Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

UNIT -II:

Atomic and Molecular Structure

Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

UNIT -III:

Water and its Treatment

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

UNIT-IV:

Organic Reactions

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic addition reactions; addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

UNIT-V:

Energy Sources

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal - proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited , 2018.

REFERENCE BOOKS:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

OUTCOMES:

The basic concepts included in this course will help the student to:

1. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
2. Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
3. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
4. Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
5. Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

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(R18A0502)OBJECT ORIENTED PROGRAMMING

OBJECTIVES:

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming and procedural programming.
- To design applications using object oriented features.
- To teach the student to implement object oriented concepts.

Unit - I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures &Loops.

Functions: Introduction to functions, Inline functions, Command Line arguments.

Unit - II

Classes and Objects:

Introduction of Classes: Class Definition, Defining a Members, Objects, Access Control, Class Scope, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Friend Functions.

Constructors and Destructors:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Destructors.

Unit - III

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Pointers: Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes.

Unit - IV

Virtual Functions and Polymorphism:

Polymorphism, Compile time polymorphism: Overloading- Function Overloading, Operator overloading, Run time polymorphism, Virtual Functions.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism.

Unit -V

Templates:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Standard Template Library Classes: STL Container classes-Array class, Vector,stack,queue, STL Algorithm classes- Sort, reverse, max, min. Application Development using C++

Text Books:

1. Object Oriented Programming with C++ by Balaguruswamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt,TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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(R18A0201) BASIC ELECTRICAL ENGINEERING

OBJECTIVES:

1. This course introduces the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
2. The emphasis is laid on the basic elements in electrical circuits.
3. Analysis of Circuits Which Includes Network Analysis & Network Theorems.
4. Analysis of Single Phase AC Circuits, Magnetic Circuits and Basic Treatment of Single Phase Transformers and DC Machines is introduced.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,

Network Theorems**:** Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem and Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form, Complex and Polar forms of representation. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Phase and Phase difference, Concept of Power Factor, Real, Reactive and Complex power, Illustrative Problems.

UNIT –IV:

Electrical Machines (elementary treatment only):

Single phase transformers: principle of operation, constructional features and emf equation. DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations:

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

OUTCOMES:

At the end of this course the student would get

1. A thorough knowledge of the basic RLC circuit elements
2. Understanding of the basic concepts of networks and circuits with RLC
3. Concepts of single phase AC circuits
4. Network theorems and their application to solve problems in Network analysis
5. Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers

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(R18A0083) ENGINEERING PHYSICS/ CHEMISTRY LAB

(Any 8 experiments compulsory)

OBJECTIVES

1. The engineering students are exposed in physics lab to understand physical parameters practically.
2. The list of experiments enables the students to know different branches like mechanics, optics and electronics.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in physics lab.

This course on physics lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any eight experiments compulsory)

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde‘s experiment –Transverse and Longitudinal modes.
3. Stewart and Gee‘s method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton‘s Rings –Radius of curvature of Plano convex lens.
7. C-R circuit – Time Constant of RC circuit
8. Characteristics of LED.
9. Characteristics of a Solar cell.
10. Evaluation of numerical aperture of optical fiber.

Reference practical physics books:

1. Practical physics by **Dr. Aparna**, V.G.S.publications.
2. Engineering physics practical lab manual – **MRCET.**

OUTCOMES

1. The students learn the concepts of error, analyze and try to formulate new solutions to the problems related to engineering physics.
2. B.Tech students basically learning the mechanical behavior of the wire and practically determining the elastic constant. Transverse and longitudinal waves are practically studied. Variation of the magnetic fields along with terrestrial magnetism is practically studied.
3. Dispersion of the composite light is clearly observed by the students. Wavelengths of the source of light/laser are determined experimentally.
4. Opto electronic devices and their working are practically realized by the students. In addition the functioning of optical fiber is practically studied.
5. The students learn experimental skills to design new experiments suitable for requirements in different fields(industrial, medical, scientific fields etc.)

MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY
(R18A0083) ENGINEERING CHEMISTRY LAB
(Any Eight Experiment Compulsory)

OBJECTIVES

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

1. Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
2. Practical implementation of fundamental concepts.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTA method.

Instrumental Methods:

Colorimetry:

2. Determination of Ferrous iron in cement by Colorimetric method
3. Estimation of Copper by Colorimetric method.

Conductometry:

4. Estimation of HCl by Conductometric titrations.
5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:

6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

Preparation:

8. Preparation of Aspirin.

Physical properties:

9. Determination of Viscosity of sample oil by Redwood Viscometer.
10. Determination of Surface Tension of a given liquid by Stalagmometer.

TEXT BOOK:

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

REFERENCE BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.

OUTCOMES:

At the end of the course students will be able to

1. Estimate the total hardness present in a sample of water.
2. Select lubricants for various purposes and determine the surface tension of a given liquid.
3. Prepare synthetic drug molecule.
4. Determine the strength of an acid by conductometric and potentiometric methods.
5. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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B.TECH- I YEAR – II- SEM – IT **L T/P/DC**

-/3/- 1.5

(R18A0582) OBJECT ORIENTED PROGRAMMING LAB

OBJECTIVES:

1. To strengthen problem solving ability by using the characteristics of an object-oriented approach.
2. To design applications using object oriented features
3. To handle Exceptions in programs.
4. To teach the student to implement object oriented concepts

Week 1:
Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positive integer.
b) Write a C++ program to generate the first n terms of the sequence.

Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
b) Write a C++ program to find both the largest and smallest number in a list of integers.

Week 4:

a) Write a C++ program to sort a list of numbers in ascending order.
b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation

Week 5

a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
b) Program to illustrate default constructor, parameterized constructor and copy constructors
c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.
b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:
a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.
d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:
a)Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

a) Write a Template Based Program to Sort the Given List of Elements.
b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
b) Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

TEXT BOOKS:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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B.TECH- I YEAR – II- SEM - IT **L T/P/D C**

- -/3/- 1.5

(R18A0281) BASIC ELECTRICAL ENGINEERING LAB

OBJECTIVES:

To Design Electrical Systems.

1. To Analyze A Given Network By Applying Various Network Theorems.
2. To Expose The Students To The Operation Of DC Generator
3. To Expose The Students To The Operation Of DC Motor and Transformer.
4. To Examine The Self Excitation In DC Generators.

CYCLE –I

1. Verification of KVL and KCL.
2. Verification of Thevenin‘s theorem.
3. Verification of Norton‘s theorem.
4. Verification of Superposition theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

CYCLE-II

7. Magnetization characteristics of DC shunt generator.
8. Swinburne‘s test on DC shunt machine.
9. Brake test on DC shunt motor.
10. OC & SC tests on single phase transformer.
11. Load test on single phase transformer.

NOTE: Any 10 of Above Experiments Are To Be Conducted

OUTCOMES:

After successfully studying this course, students will:

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines
3. Acknowledge the principles of operation and the main features of electric machines and their applications.
4. Acquire skills in using electrical measuring devices.

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2 -/-/- -

(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVE

(Mandatory Course)

OBJECTIVES:

This introductory course input is intended:

1. to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. to facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. to highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.

10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.

They can have satisfying human behavior throughout their life.

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II Year B.Tech IT -I Sem	**3**	**-/-/-**	**3**

(R18A1201) COMPUTER ORGANIZATION AND ARCHITECTURE

OBJECTIVES:

The students will be exposed:

1. To how the Computer Systems work and its basic principles
2. To Instruction Level Architecture and Instruction Execution and memory system design
3. To how the I/O devices are accessed and its principles.
4. To Instruction Level Parallelism and knowledge on micro programming
5. To the concepts of advanced pipelining techniques.

UNIT - I:

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Computer Organization and Architecture - Von Neumann

Data representation: signed number representation, fixed and floating point Representations, Character representation. Computer arithmetic – integer addition and Subtraction, Ripple carry adder, carry look-ahead adder, etc. Multiplication – shift-and add, Booth multiplier, Carry save multiplier, etc. Division restoring and non-restoring techniques, Floating point arithmetic.

UNIT – II:

Introduction to x86 architecture.

Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL Interpretation of instructions, addressing modes, instruction set.

CPU Control unit design: Hardwired and micro-programmed design approaches

UNIT – III:

Memory system design: Semiconductor memory technologies, memory organization.

Memory organization: Memory interleaving, concept of hierarchical memory organization, Cache memory, cache size vs. block size, mapping functions, Replacement algorithms, write policies.

UNIT – IV:

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

UNIT – V:

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

TEXT BOOKS:

1. **"**Computer Organization and Design: The Hardware/Software Interface‖, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. –Computer Organization and Embedded Systems‖, 6th Edition by CarlHamacher,McGraw Hill Higher Education.

REFERENCE BOOKS:

1. –Computer Architecture and Organization‖, 3rd Edition by John P. Hayes,WCB/McGraw-Hill
2. –Computer Organization and Architecture: Designing for Performance‖, 10th Editionby William Stallings, Pearson Education.
3. –Computer System Design and Architecture‖, 2nd Edition by Vincent P. Heuringand Harry F. Jordan, Pearson Education.

Course Outcomes :

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessor for computing16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodolog

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II Year B.Tech IT - I Sem 3-/-/-3

(R18A0503) DATA STRUCTURES

Prerequisites: A course on ―Programming for Problem Solving‖.

Course Objectives:

- To impart the basic concepts of data structures
- Exploring basic data structures such as stacks queues and lists.
- Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.
- To understand concepts about searching and sorting techniques

UNIT-I

Introduction : Abstract data types, **Singly linked list**: Definition, operations: Traversing, Searching, Insertion and deletion, **Doubly linked list**: Definition, operations: Traversing, Searching, Insertion and deletion ,**Circular Linked List**: Definition, operations: Traversing, Searching, Insertion and deletion.

UNIT-II

Stack: Stack ADT, array and linked list implementation, Applications- expression conversion and evaluation. Queue : Types of Queue: Simple Queue, Circular Queue, Queue ADT- array and linked list implementation. Priority Queue, heaps.

UNIT-III

Searching: Linear and binary search methods. **Sorting:** Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort. Time Complexities .**Graphs:** Basic terminology, representation of graphs, graph traversal methods DFS,BFS

UNIT IV

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. **Hash Table Representation:** hash functions, collision resolution- separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT-V

Binary Search Trees: Various Binary tree representation, definition, BST ADT, Implementation, Operations- Searching, Insertion and Deletion, Binary tree traversals, threaded binary trees,

AVL Trees :Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, B-Trees: B-Tree of order m, height of a B-Tree, insertion, deletion and searching, B+ Tree.

TEXTBOOKS:

1. Data Structures using C++, Special Edition-MRCET, Tata McGraw-Hill Publishers 2017.

2. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd. Education.

REFERENCE BOOKS:

1. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition

OUTCOMES:

At the end of the course the students are able to:

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations of

combinations.

- Implement and know the application of algorithms for sorting .
- Design programs using a variety of data structures, including hash tables, binary and general

tree structures, search trees, AVL-trees, heaps and graphs.

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II Year B.Tech IT -I Sem	**3**	**-/-/-**	**3**

(R18A0504) OPERATING SYSTEMS

OBJECTIVES:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture,
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management

UNIT-I

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.

UNIT-II

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion,Hardware Solution, Strict Alternation, Peterson‘s Solution, The Producer/Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader‘s & Writer Problem, Dinning Philosopher Problem etc.

UNIT-III

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software.

UNIT-V

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

TEXT BOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin,Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India.

REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hallof India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

OUTCOMES:

At the end of the course the students are able to:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPUutilization, Throughput, Turnaround Time, Waiting Time, Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

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II Year B.Tech IT -I Sem	**3**	**-/-/-**	**3**

(R18A506) DISCRETE MATHEMATICS

OBJECTIVES:

The course should enable the students to:

- Describe the logical and mathematical foundations, and study abstract models of computation.
- Illustrate the limitations of predicate logic.
- Define modern algebra for constructing and writing mathematical proofs.
- Solve the practical examples of sets, functions, relations and recurrence relations.
- Recognize the patterns that arise in graph problems and use this knowledge for constructing the trees and spanning trees

UNIT - I MATHEMATICAL LOGIC AND PREDICATES

Mathematical logic: Statements and notations, connectives, well-formed formulas, truth tables, tautology, equivalence implication; Normal forms: Disjunctive normal forms, conjunctive normal forms, principle disjunctive normal forms, principle conjunctive normal forms;

Predicate calculus: Predicative logic, statement functions, variables and quantifiers, free and bound variables, rules of inference, consistency, proof of contradiction, automatic theorem proving.

UNIT - II RELATIONS, FUNCTIONS AND LATTICES

Relations: Properties of binary relations, equivalence, compatibility and partial ordering relations, lattices, Hasse diagram; Functions: Inverse function, composition of functions, recursive functions; **Lattices:** Lattices as partially ordered sets; Definition and examples, properties of lattices, sub lattices, some special lattices.

UNIT - III ALGEBRAIC STRUCTURES AND COMBINATORICS

Algebraic structures: Algebraic systems, examples and general properties, semi groups and monoids, groups,sub groups, homomorphism, isomorphism, rings.

Combinatorics: The fundamental counting principles, permutations, disarrangements, combinations, permutations and combinations with repetitions, the binomial theorem, multinomial theorem, generalized inclusion exclusion principle.

UNIT - IV RECURRENCE RELATION

Recurrence relation: Generating functions, function of sequences calculating coefficient of generating function, recurrence relations, solving recurrence relation by substitution and generating functions, Characteristics roots solution of homogeneous recurrence relation.

UNIT - V GRAPHS AND TREES

Graphs: Basic concepts of graphs, isomorphic graphs, Euler graphs, Hamiltonian graphs, planar graphs, graph coloring, digraphs, directed acyclic graphs, weighted digraphs, region graph, chromatic numbers;

Trees: Trees, spanning trees, minimal spanning trees.

TEXTBOOKS:

1. J. P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science , Tata McGraw Hill, India, 1st Edition,1997.
2. JoeL.Mott,AbrahamKandel,TheodoreP.Baker,—DiscreteMathematicsforComputerScientists and Mathematicians, Prentice Hall of India Learning Private Limited, New Delhi, India, 2nd Edition, 2010.

REFERENCE BOOKS

1. Kenneth H. Rosen, —Discrete Mathematics and Its Applications, Tata Mcgraw-Hill, New Delhi, India, 6th Edition,2012.
2. C. L. Liu, D. P. Mohapatra, —Elements of Discrete Mathematics, Tata Mcgraw-Hill, India, 3rd Edition,2008.
3. Ralph P. Grimaldi, B. V. Ramana, —Discrete and Combinatorial Mathematics - An Applied
4. Introduction , Pearson Education, India, 5th Edition, 2011.
5. D. S. Malik, M. K. Sen, —Discrete Mathematical Structures: Theory and Applications, Thomson Course Technology, India, 1st Edition, 2004.

OUTCOMES:

At the end of the course the students are able to:

- For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
- For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
- For a given a mathematical problem, classify its algebraic structure
- Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
- Develop the given problem as graph networks and solve with techniques of graph theory.

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II Year B.Tech IT -I Sem	**3**	**-/-/-**	**3**

(R18A0024) PROBABILTY AND STATISTICS

OBJECTIVES:

- To understand a random variable that describes randomness or an uncertainty in certain realistic situations which can be either discrete or continuous type.
- To learn functions of multiple random variables through joint distributions since the random situations are described as functions of multiple random variables.
- To learn some of the important probability distributions like Binomial, Poisson Distributions (discrete case) and the Normal Distribution (continuous case).
- To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
- To make inferences about a population from sample data(large and small samples) using probability theory.

UNIT – I: Random Variables

Single and multiple random variables -discrete and continuous. Probability distribution function, mass function and density function of probability distributions.Mathematical expectation and variance.

UNIT-II: Probability distributions

Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and normal distribution – properties, mean and variance.

UNIT -III: Correlation and Regression

Correlation -coefficient of correlation, rank correlation. Regression-regression coefficients, lines of regression.

UNIT –IV: Sampling

Sampling: Definitions of population, sampling, statistic, parameter - types of sampling - expected values of sample mean and variance, standard error - sampling distribution of means and variance. Estimation - point estimation and interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, critical region - confidence interval - Level of significance, one tailed and two tailed test.

Unit-V: Statistical Inferences

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, and difference of proportions.

Small samples: Test for single mean, difference of means, test for ratio of variances (F-test) - Chi-square test for goodness of fit and independence of attributes.

TEXT BOOKS:

1. Fundamental of Statistics by S.C. Gupta, Himalaya Publishing House.
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K. Kapoor, Sultan Chand Publishers.
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press.
2. Probability and Statistics by Dr.T.K.V Iyengar , B.KrishnaGandhi ,S. Ranganatham & M V S S A N Prasad. S Chand Publishers.

COURSE OUTCOMES:

At the end of the course the students are able to:

- Describe randomness in certain realistic situation which can be either discrete or continuous type.
- Provide very good insight which is essential for industrial applications by learning probability distributions.
- Make data-driven decisions by using correlation and regression.
- Understand the importance of sampling distribution of a given statistic of a random sample.
- Draw statistical inference using samples of a given size which is taken from a population and to apply statistical methods for analyzing experimental data.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

	L	T/P/D	C
II Year B.Tech IT -I Sem	**3**	**-/-/-**	**3**

(R18A0461) ANALOG & DIGITAL ELECTRONICS

COURSE OBJECTIVES

The main objectives of the course are:

- To familiarize the student with the principal of operation, analysis and design of junction Diode and BJT.
- To understand basic number systems codes and logical gates.
- To introduce the methods for simplifying Booleanexpressions
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, diode equivalent circuits,, Zener diode characteristics.

UNIT-II

BIPOLAR JUNCTION TRANSISTOR: The Junction transistor, Transistor construction

,Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

UNIT-III

Number System and Boolean Algebra: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code,Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-IV

Minimization Techniques:

The Karnaugh Map Method, Three, Four and Five Variable Maps, Prime and Essential Implications, Don‘t Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

UNIT-V

Combinational Circuits:

Design procedure – Half adder, Full Adder, Half subtractor, Full subtract or, Multiplexer/Demultiplexer, decoder, encoder, Code converters, Magnitude Comparator.

Sequential circuits: Latches, Flip-Flops-SR, JK, D, T and master slave, characteristic tables and equations, Conversion from one type of Flip-Flop to another.

TEXT BOOKS:

1 –Electronic Devices & Circuits‖, Special Edition – MRCET, McGraw Hill Publications, 2017.

2 Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.

3 Electronic Devices and Circuits, S.Salivahanan, N.Suresh kumar, McGraw Hill.

4 M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 /Pearson Education

(Singapore) Pvt. Ltd., New Delhi, 2003.

5 Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.S Publications

2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.

3. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006

4. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.

5. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2003.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

1. Understand and Analyze the PN and Zener diodes, operation and its characteristics
2. Understand and analyze the BJT Transistor.
3. Understand the basic postulates of Boolean algebra and shows the correlation between Boolean expressions
4. Learn the methods for simplifying Boolean expressions
5. Understand the formal procedures for the analysis and design of combinational circuits and sequential circuits

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(R18A0583) OPERATING SYSTEMS LAB

OBJECTIVES:

- To understand the functionalities of various layers of OSI model
- To explain the difference between hardware, software; operating systems, programs and files.
- Identify the purpose of different software applications.

Week 1: Simulate the following CPU scheduling algorithms.
Round Robin b) SJF c) FCFS d) Priority.

Week 2: Simulate all file allocation strategies
Sequential b) Indexed c)
Linked.

Week 3: Simulate MVT and MFT.

Week 4: Write a 0C program to simulate the following contiguous memory allocation techniques a) Worst fit b) Best fit c) First fit.

Week 5: Simulate all File Organization Techniques
Single level directory b) Two level c) Hierarchical d) DAG.

Week 6: Simulate Bankers Algorithm for Dead Lock Avoidance.

Week 7: Simulate Bankers Algorithm for Dead Lock Prevention.

Week 8: Write a C program to simulate disk scheduling

algorithms.
a) FCFS b) SCAN c) C-SCAN

Week 9: Simulate all page replacement algorithms
a)FIFO b) LRU c) LFU

Week 10: Simulate Paging Technique of memory management.

Week 11: Write a C program to simulate producer-consumer problem using semaphores.

Week 12: Write a C program to simulate the concept of Dining-philosophers problem.

REFERENCE BOOKS:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI.
2. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI

OUTCOMES:

At the end of the course the students are able to:

- Ability to implement inter process communication between two processes.
- Ability to design and solve synchronization problems.
- Ability to simulate and implement operating system concepts such as scheduling, Deadlock management, file management, and memory management.

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II Year B.Tech IT -I Sem	**-**	**/3/**	**1.5**

(R18A0584) DATA STRUCTURES LAB

OBJECTIVES:

- To make the student learn a object oriented way of solving problems.
- To make the student write ADTS for all data structures.

Week 1.

Write a program that uses functions to perform the following operations on singly linked List

i) Creation
ii) Insertion
iii) Deletion
iv) Traversal.

Week 2.

Write a program that uses functions to perform the following operations on doubly linked List

i) Creation
ii) Insertion
iii) Deletion
iv) Traversal.

Week 3.

Write a program that uses functions to perform the following operations on circular linked List

i) Creation
ii) Insertion
iii) Deletion
iv) Traversal.

Week 4.

Write a program that implement stack (its operations) using

i) Arrays
ii) Linked list(Pointers).

Week 5.

Write a program that implement Queue (its operations) using

i) Arrays
ii) Linked list(Pointers).

Week 6.

i) Write a program that implement Circular Queue (its operations) using Arrays.

ii) Write a program that use both recursive and non recursive functions to perform thefollowing searching operations for a Key value in a given list of integers:
   a) Linear search
   b) Binary search.

Week 7.

Write a program that implements the following sorting

1. Bubble sort
2. Selection sort
3. Quick sort.

Week 8.

Write a program that implements the following

1. Insertion sort
2. Merge sort
3. Heap sort.

Week 9.

Write a program to implement all the functions of a dictionary (ADT)using Linked List.

Week 10.

Write a program to perform the following operations:

a) Insert an element into a binary search tree.
b) Delete an element from a binary search tree.
c) Search for a key element in a binary search tree.

Week 11.

Write a program to implement the tree traversal methods.

Week 12.

Write a program to perform the following operations:

a) Insert an element into a AVL tree.
b) Delete an element from a AVL tree.
c) Search for a key element in a AVL tree.

TEXTBOOKS:

1. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.
2. Data Structures using C++, D.S. Malik, Thomson

OUTCOMES:

At the end of the course the students are able to:

- For a given Search problem (Linear Search and Binary Search) student will able to implement it.
- For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
- Student will able to write program for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

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(R18A0004) FOREIGN LANGUAGES-FRENCH

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

OBJECTIVES

1. To inculcate the basic knowledge of the French language.
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation.
3. To culminate their major with evidence of a purposeful education.

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs –to be ' and –to have " in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:

Speaking: Talk about one‘s family – description of a person - express his admirations and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar: The expression of time – The –ir verbs in the present - The verbs do, go, take, come, -Adverbs - Reflexive verbs

Vocabulary: The days and months of the year - The sports – Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs –to want‖, –to can‖ - Express capacity / possibility - Express will / desire – the future tense

Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

OUTCOMES

1. The students will be able to communicate in French at A1 level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study opportunities in the countries where French is the official language.

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(R18A0511) SOFTWAREENGINEERING

Objectives:

The students will be able :

1. To comprehend the various software process models.
2. To understand the types of software requirements and SRS document.
3. To know the different software design and architectural styles.
4. To learn the software testing approaches and metrics used in software development.
5. To know about quality control and risk management.

UNIT - I:

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, Process patterns, process assessment.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process, Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools

UNIT - II:

Software Requirements: Functionaland non-functionalrequirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Datamodels, Object models,structured methods. UML Diagrams.

UNIT - III:

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT - V:

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The Capability Maturity Model Integration (CMMI), Software reliability, The ISO 9000 quality standards.

TEXT BOOKS :

1. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS :

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
5. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
7. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
8. Introduction to Software Engineering, R. J. Leach, CRC Press.

Course Outcomes:

Students will have the ability:

1. To compare and select a process model for a business system.
2. To identify and specify the requirements for the development of an application.
3. To develop and maintain efficient, reliable and cost effective software solutions.
4. To critically think and evaluate assumptions and arguments of the client.

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IIYearB.TechIT-IISem **3 -/-/- 3**

(R18A1202)AUTOMATA AND COMPILER DESIGN

OBJECTIVES:

- To provide an understanding of automata ,grammars, language translators.
- To know the various techniques used in compiler construction
- To be aware of the process of semantic analysis.
- To analyze the code optimization & code generationtechniques.

UNIT - I:

Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata

– DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Context Free grammars and parsing, derivation, parse trees, Application of Finite Automata.

UNIT - II:

Introduction To Compiler, Phases of Compilation, ambiguity LL(K) grammars and LL(1) parsing Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

Semantics: Syntax directed translation, S-attributed and L-attributed grammars, Intermediate code – abstract syntax tree, translation of simple statements and control flow statements.

UNIT - III:

Context Sensitive features – Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

UNIT - IV:

Run time storage: Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation.

Code optimization: Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, Data flow analysis of flow graphs.

UNIT - V:

Code generation: Machine dependent code generation, object code forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

TEXT BOOKS:

1. Introduction to Theory of computation.Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education.

COURSE OUTCOMES:

- Understand the necessity and types of different language translators inuse.
- Apply the techniques and design different components (phases)of a compiler.
- Abilityto implement practical aspects of automata theory.
- Use the tools Lex, Yacc in compiler construction.

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(R18A0509)JAVA PROGRAMMING

Objectives:

- The objective of this course is to provide object oriented concepts through which robust, secured and reusable software can be developed.
- To understand object oriented principles like abstraction, encapsulation, inheritance, polymorphism and apply them in solving problems.
- To understand the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes.
- To understand the implementation of packages and interfaces.
- To understand the concepts of exception handling, multithreading and collection classes.
- To understand how to connect to the database using JDBC.
- To understand the design of Graphical User Interface using applets and swing controls.

UNIT-I

Java Programming- History of Java, comments, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, arrays, simple java stand alone programs, class, object, and its methods constructors, methods, static fields and methods, access control, this reference, overloading constructors, recursion, exploring string class, garbage collection

UNIT – II

Inheritance – Inheritance types, super keyword, preventing inheritance: final classes and methods..

Polymorphism – method overloading and method overriding, abstract classes and methods**.**

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface, inner class.

Packages- Defining, creating and accessing a package, importing packages.

UNIT-III

Exception handling-Benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.

Multithreading – Differences between multiple processes and multiple threads, thread life cycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer problem.

UNIT-IV

Collection Framework in Java – Introduction to java collections, Overview of java collection framework, Commonly used collection classes- Array List, Vector, Hash table, Stack, Lambda Expressions.

Files- Streams- Byte streams, Character streams, Text input/output, Binary input/output, File management using File class.

Connecting to Database – JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC,Data Access Object (DAO).

UNIT-V

GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – Jbutton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types – border, grid and flow

Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

TEXT BOOK:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Core Java: An Integrated Approach – Dr R Nageswara Rao

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
5. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides.

Outcomes:

- An understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs using a high level language;
- An appreciation of the principles of object oriented programming;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Demonstrate the ability to use simple data structures like arrays in a Java program.
- Be able to make use of members of classes found in the Java API (such as the Math class).
- Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
- Able to develop applications using Applet, AWT, JDBC and Swings

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(R18A0510) DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

UNIT I:

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction – Instances and Schemas – Database Languages – database Access for applications Programs – Database Users and Administrator – Transaction Management – Database Architecture – Storage Manager – the Query Processor.

Data Models: Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams. Database design– Other Models, ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations.

UNIT II:

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple Relational Calculus (TRC) – Domain relational calculus (DRC).

Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers, Procedures.

UNIT III:

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form.

Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form

UNIT IV:

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

UNIT V:

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Check Points - Buffer Management – Failure with loss of nonvolatile storage.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.(All UNITS except III th)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.

REFERENCE BOOKS:

1. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
2. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition for UNIT III.

Outcomes:

- Demonstrate the basic elements of a relational database management system
- Ability to identify the data models for relevant problems
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data
- Apply normalization for the development of application software‘s

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3 -/-/- 3

(R18A0061)MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

Course Outcomes:

Students should be able,

- To understand the basic economic principles, forecast demand and supply.
- To estimate cost and understand market structure, pricing practices.
- To interpret the financial results of the organisation.

Unit-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.

Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

Unit-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing;

Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

Unit-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

References:

- Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
- D.N. Dwivedi, Managerial Economics, Vikas Publications.
- Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
- P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
- S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
- M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

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II Year B.Tech IT -II Sem --/2/- 0

(R18A0014) ENVIRONMENTAL SCIENCES (Mandatory Course)

Objectives:

1. To understand the importance of ecological balance for sustainable development
2. To know the importance of Natural resources
3. To understand the impacts of developmental activities and mitigation measures for recognizing each and every action of us, reflects on the environment and viceversa.
4. To know the significance of waste management

UNIT I- ENVIRONMENTAL EDUCATION AND ECOSYSTEMS [6 periods]

Environmental education: Definition and objective. Structure and function of an ecosystem, Food chain and Food Web, Ecological Pyramids, Bioaccumulation and Biomagnification.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on importance of Environmental Education

UNIT II- NATURAL RESOURCES [6 periods]

Introduction: definition, Forest resources- Uses, Causes and consequences of deforestation, Water resources-Sources and Uses of Water, Benefits and problems of DAMs, Energy resources-Renewable and Non-renewable energy resources.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Natural Resources

UNIT III- ENVIRONMENTAL POLLUTION [10 periods]

Environmental segments – structure and composition of atmosphere. Pollution – Sources, effects and control of Air, water. Climate change-ozone layer depletion, Global warming/greenhouse effect.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Environmental pollution.

UNIT IV- WASTE MANAGEMENT [6 periods]

Sources, effects and control of solid waste, bio medical waste - waste management and E-waste.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Cleanliness, segregation of waste and Swacha-Bharath.

UNIT V- Social Issues and the Environment [6 periods]

Concept, threats and strategies of sustainable development, Water conservation-rain water harvesting, Energy conservation, Green activities.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Social Issues and the Environment.

SUGGESTED TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.
2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Principles of Environmental Science by William . P. Cunnningham & Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

Course Outcomes:

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of Ecological principles and environmental regulations which in turn will help in sustainable development
2. This course will sensitise the students through activities assigned to them after every unit
3. This course will help the students understand the complex relationships between natural and human systems

OPENELECTIVE-I

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

L T/P/C

II Year B.Tech IT -II Sem **3 -/-/-3**

OPEN ELECTIVE - I

(R18A0451) DIGITAL ELECTRONICS

COURSE OBJECTIVES:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,
AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and
Exclusive-NAND implementations of Logic Functions using gates, NAND-
NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan‘s Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don‘t care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices- Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

TEXT BOOK:

1. M Morris Mano, –Digital Design‖, 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, ―Digital Principles and Applications‖, 6th Edition, TMH, 2006.

REFERENCES:

1. John F Wakerly. –Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, –Digital Logic Applications and Design‖, Thomson Learning, 2006
3. Charles H Roth, –Fundamentals of Logic Design‖, 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, –Digital Fundamentals‖, 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, –Digital Principles and Design‖, TMH, 2003.

COURSE OUTCOMES

After the completion of the course, the student will be able to:

1) Analyze different methods used for simplification of Boolean expressions
2) Design and implement Combinational and Sequential circuits.
3) Design and implement Synchronous and Asynchronous Sequential Circuits

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II Year B.Tech II Sem **L T/P/D C**

3 -/-/- 3

OPEN ELECTIVE - I
(R18A0551) DATABASE SYSTEMS

OBJECTIVES:

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS. DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations-Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated-Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's-Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF-Decompositions and desirable properties -

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,**

Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan,‖ Database System Concepts‖, McGraw-Hill, 6th Edition , 2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, –Database Management System‖, McGraw Hill., 3rd Edition 2007.
2. Elmasri & Navathe,‖ Fundamentals of Database System,‖ Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, –An Introduction to Database‖, Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, –Database Systems – Design, Implementation, and Management‖, 9th Edition, Thomson Learning, 2009.

OUTCOMES

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data

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II Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE I
(R18A0553) DATA STRUCTURES USING PYTHON

OBJECTIVES:

1) To read and write simple Python programs.
2) To develop Python programs with conditionals and loops.
3) To define Python functions and call them.
4) To use Python data structures –- lists, tuples, dictionaries.
5) To do input/output with files in Python.

UNIT I

Introduction to Python, Installation and Working with Python, Understanding Python variables Python basic Operators, Understanding python blocks, Python Data Types: Declaring and using Numeric data types: int, float,complex,Using string data type and string operations.

UNIT II

Control Flow- if, if-elif-else,loops ,For loop using ranges, string ,Use of while loops in python,Loop manipulation using pass, continue, break and else,Programming using Python conditional and loops block,Python arrays.

UNIT III

Functions -Calling Functions, Passing Arguments, Keyword Arguments,Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.Powerful Lamda function in python.

UNIT IV

Data Structures-List Operations, Slicing, Methods; Tuples, Sets, Dictionaries,Sequences. Comprehensions,Dictionary manipulation, list and dictionary in build functions

UNIT V

Sorting: BubbleSort,SelectionSort,InsertionSort,Mergesort,Quicksort.LinkedLists,Stacks,Queues

OUTCOMES:

Upon completion of the course, students will be able to

1) Read, write, execute by hand simple Python programs.
2) Structure simple Python programs for solving problems.
3) Decompose a Python program into functions.
4) Represent compound data using Python lists, tuples, dictionaries.
5) Read and write data from/to files in Python Programs

TEXT BOOKS

1) Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist__, 2nd edition, Updated for Python 3, Shroff/O_Reilly Publishers, 2016.
2) R. Nageswara Rao, ‐Core Python Programming‖, dreamtech
3) Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1) Core Python Programming, W.Chun, Pearson.
2) 2. Introduction to Python, Kenneth A. Lambert, Cengage
3) 3. Learning Python, Mark Lutz, Orielly

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech II Sem **LT/P/ C**

3 -/-/- 3

OPEN ELECTIVE - I
(R18A0351) INTELLECTUAL PROPERTY RIGHTS

OBJECTIVES:

- To create an understanding on Intellectual Properties and the importance of it.
- To acquire knowledge on Trademarks, Trade secrets & unfair completion methods.
- To create awareness on the protection of copyrights and patents.
- To attain basic understanding of Cyber laws, Cyber Crime and get an understanding of Privacy of Data.
- To gain knowledge on international aspects and the Emerging Trends in IPR.

UNIT - I:

Introduction: Introduction to Intellectual property, types of intellectual property, importance of intellectual property rights, agencies Responsible for Intellectual property Registration, Regulatory – Compliance and Liability Issues.

UNIT - II:

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, Transfer of Rights, protectable matter, selecting and evaluating trade mark, Registrations of Trade Marks, Claims.

Trade Secrets: Determination of trade secret status, liability for misappropriations of trade secrets, protection for submission.

Unfair competition- Misappropriation right of publicity, false advertising

UNIT - III:

Copy rights: Fundamental of copy right, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, notice of copyright.

Patents: introduction, patent searching process, ownership rights and transfer.

UNIT - IV:

Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

UNIT - V:

New development of Intellectual Property: Emerging trends in trade mark; copy rights, patent, International overview on intellectual property.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah, E. Bouchoux, cengagelearning.
2. Cyber Law. Text & Cases, South-Western‘s Special Topicscollections.
3. R. Radha Krishnan, S. Balasubramanian: ‒Intellectual Property Rights‖, Excel Books. New Delhi
4. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.

5. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
6. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
7. Intellectual Property Rights: C B Raju: ISBN-8183870341

COURSE OUTCOMES:
Student will be able to:

1. Prepare and protect the Inventions, startup ideas and rights of patents and copy rights etc.,
2. Gain knowledge on Trademarks and Trade Secrets.
3. Brings awareness on the various types of Unfair Competition and gets well versed with exposure to licensing and transfer of Copyrights and Patents
4. Attain awareness of Cyber laws and Cyber Crime, to protect the data from Cybercrime.
5. Comprehend emerging trends in IPR globally.

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II Year B.Tech II Sem **L T/P/D C**

3 -/-/- 3

OPEN ELECTIVE - I
(R18A0352) GREEN ENERGY SYSTEMS

OBJECTIVES:

1. The course aims to highlight the significance of alternative sources of energy.
2. Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.
3.

UNIT-I

Introduction: Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics. Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

Solar Energy Storage And Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

Energy Efficient Systems: (A) Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

(B) Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Green Buildings: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth & John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa
5. Renewable Energy Technologies/ G.D Roy
6.

COURSE OUTCOMES:

1. The student shall understand the principles and working of solar, wind, biomass, geo-thermal, ocean energies.
2. Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future application.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech.IISem

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3	-/-/-	3

OPEN ELECTIVE I

(R18A0555) DATA VISUALIZATION

Course Objectives:

- To learn different statistical methods for Data visualization.
- To understand the basics of R and Python.
- To learn usage of Watson studio.
- To understand the usage of the packages likeNumpy, pandas and matplotlib.
- To know the functionalities and usages of Seaborn.

UNIT I

Introduction to Statistics : Introduction to Statistics, Difference between inferential statistics and descriptivestatistics, Inferential Statistics- Drawing Inferences fromData, RandomVariables, Normal ProbabilityDistribution, Sampling, Sample Statistics and SamplingDistributions.

R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

UNIT II

Data manipulation withR: Data manipulation packages-dplyr,data.table, reshape2, tidyr, Lubridate, Data visualization withR.

Data visualization in Watson Studio: Adding data to datarefinery, Visualization of Data on WatsonStudio.

UNIT III

Python: Introduction toPython, How toInstall, Introduction to JupyterNotebook, Python scriptingbasics, NumpyandPandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and datetime columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools inPython- Introduction to Matplotlib, Basic plots usingmatplotlib, Specialized Visualization Tools usingMatplotlib, Advanced Visualization Tools usingMatplotlib-WaffleCharts, WordClouds.

UNIT V

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.
2. Hands on programming with R by Garrett Grolemund,Shroff/O'Reilly; First edition
3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress
2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc. \
3. The Comprehensive R Archive Network- https://cran.r-project.org
4. https://seaborn.pydata.org/
5. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization.
- Gain knowledge on R and Python
- Understand usage of various packages in R and Python.
- Demonstrate knowledge of Watson studio.
- Apply data visualization tools on various data sets.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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II Year B.Tech IT -II Sem - - /3/-1.5

(R18A0585) JAVA PROGRAMMING LAB

OBJECTIVES:

- To prepare students to become familiar with the Standard Java technologies of J2SE
- To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorous education.
- To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP, JavaScript
- To train Students with good OOP programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
- To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.

Week 1: A) Write a java program to find the Fibonacci series using recursive and non recursive functions.

B) Write a java program to multiply two given matrices.

Week 2: A) Write a java program for Method overloading and Constructor overloading.

B) Write a java program to display the employee details using Scanner class.

C) Write a java program that checks whether a given string is palindrome or not.

Week 3: A) Write a java program to represent Abstract class with example.

B) Write a java program to implement Interface using extends keyword.

Week 4: Write a java program to create user defined package.

Week 5: A) Write a java program to create inner classes.

B) Write a java program for creating multiple catch blocks.

Week 6: A) Write a java program for producer and consumer problem using Threads.

B) Write a Java program that implements a multi-thread application that has three threads.

Week 7: A) Write a java program to display File class properties.

B) Write a java program to represent ArrayList class.

Week 8: Write a Java program loads phone no, name from a text file using hash table.

Week 9: Write an applet program that displays a simple message.

A) Write a Java program compute factorial value using Applet.

B) Write a program for passing parameters using Applet.

Week 10: Write a java program for handling Mouse events and Key events

Week 11: A) Write a java program that connects to a database using JDBC
B) Write a java program to connect to database using JDBC &insert values into table
C) Write a java program to connect to a database using JDBC and delete values from table.

Week 12: Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result.

TEXT BOOK:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

REFERENCE BOOKS:

2. 1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI

OUTCOMES:

- Able to analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
- Demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and report results.
- Demonstrate an ability to design an object oriented system, AWT components or multithreaded process as per needs and specifications.
- Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets program

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II Year B.Tech IT -II Sem	-	-/3/-	1.5

(R18A0586) DATABASE MANAGEMENT SYSTEMS LAB

Objectives:

1. To familiarize database design concepts using ER modeling and Relational model.
2. To enable students to use SQL to query database and perform all types of operations and understanding normalization and effective database design principles
3. To enable students to use Non-Relational DBMS and understand the usage of Document oriented and distributed databases.
4. To enable the students to use TCL and DCL Commands and perform all states of Transaction operations

A. **Practice on SQL Queries to acquire knowledge on RDBMS.**

B. **Case Study:**

Objective: This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, develop ing and querying a database in the context of example database - Roadway travels". Students are expected to use "Mysql" database.

Roadway Travels: "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations
- **Reservations & Cancellation**:

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above Process involves many steps like 1. Analyzing the problem and identifying the Entitites and Relationships, 2. E-R Model, 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

Experiment 1: E-R Model

Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc. Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example:

Entities:

1. B U S
2. Ticket
3. Passenger

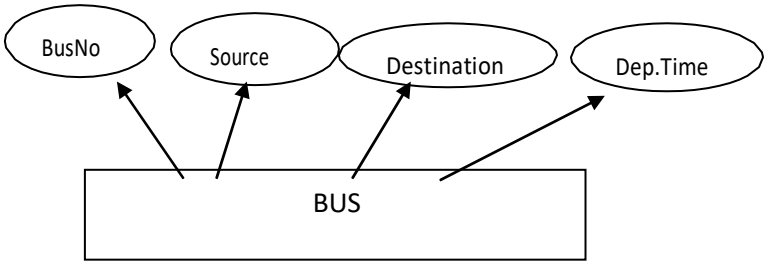
Relationships:

1. Reservation
2. Cancellation

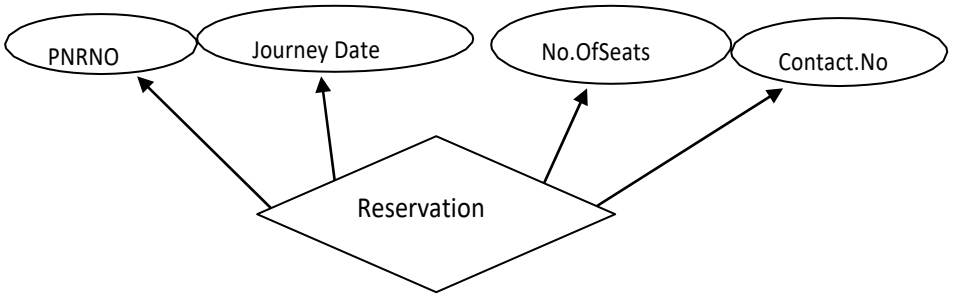
PRIMARY KEY ATTRIBUTES:

1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus_NO(Bus Entity)

Apart from the above mentioned entities you can identify more. The above mentioned are few.



Ex: Bus Entity



Ex: Reservation relationship

Note: The student is required to submit a document by writing the Entities and Keys to the lab teacher

Experiment 2: Concept design with E-R Model Note: -

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total/partial).Try to incorporate Generalization, Aggregation,
Specialization etc wherever required.

Note: The student is required to submit a document by drawing the E-R diagram to the lab teacher.

Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion.

Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attribute as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued and Derived) have different way of Representation.

Example: The passenger looks as below .This is an example. You can add more attributes based on your E-R-Model

This is not normalized table.

Passenger Name Age Sex Address

Ticket_id Passport ID

Note: The student is required to submit a document by represent relationships in a tabular fashion to the lab teacher.

Experiment 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain typesof logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger Name Age Sex Address Passport ID

Passport_id Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

Experiment 5: Installation of Mysql / MongoDB / NoSQL and practicing DDL, commands

Installation of MySql / MongoDB / NoSQL . In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

5.a) Example for creation of a normalized "Passenger" table. CREATE TABLE Passenger (Passport_id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL,Age Integer Not NULL,Sex Char,Address VARCHAR (50) Not NULL);

Similarly create all other tables.

Note: Detailed creation of tables is given at the end**.**

5.b) Installation of MongoDB

Installation of MongoDB on Windows, MongoDB is a cross-platform, document oriented database that provides, high performance, high availability, and easy scalability. MongoDB works on concept of collection and document. In this week You will Learn with MongoDB. How to create Database, Collection, Document, Field, Embedded Documents. Relationships in MongoDB represent how various documents are logically related to each other. Relationships can be modeled via **Embedded** and **Referenced** approaches.

Eg: MongoDB **db.createCollection(name, options)** is used to create collection.

Basic syntax of createCollection() method

```
>use test
switched to db test
>db.createCollection("mycollection")
{ "ok" : 1 }
>
```

created collection by using the command show collections.

```
>show collections
mycollection
system.indexes
```

Installation of NoSQL

NoSQL is a non-relational database management Systems, different from traditional relational database management systems. It is designed for distributed data stores where very large scale of data storing needs.for example Google or Facebook which collects terabits of data every day for their users. Stands for Not Only SQL , No declarative query language, No predefined schema, Key-Value pair storage, Column Store, Document Store, Graph databases, Eventual consistency rather ACID property, Unstructured and unpredictable data, CAP Theorem, Prioritizes high performance, high availability and scalability, BASE Transaction

Key Value Pair Based

Data is stored in key/value pairs. It is designed in such a way to handle lots of data and heavy load. Key-value pair storage databases store data as a hash table where each key is unique, and the value can be a JSON, BLOB(Binary Large Objects), string, etc.

For example, a key-value pair may contain a key.

Key	Value
Name	Joe Bloggs
Age	42
Occupation	Stunt Double
Height	175cm
Weight	77kg

Redis, Dynamo, Riak are some examples of key-value store DataBases. They are all based on Amazon's Dynamo paper.

Column-based NoSQL databases are widely used to manage data warehouses, business intelligence, CRM, Library card catalogs,

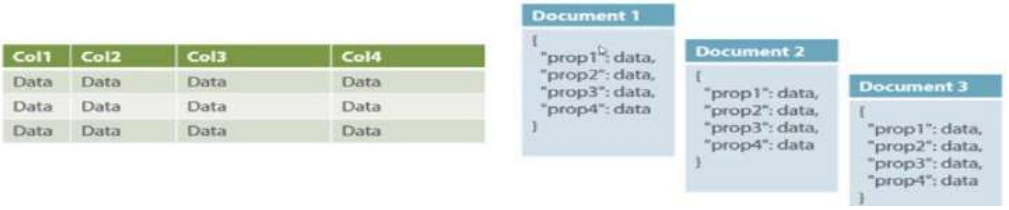
ColumnFamily			
Row Key	Column Name		
	Key	Key	Key
	Value	Value	Value
	Column Name		
	Key	Key	Key
	Value	Value	Value

HBase, Cassandra, HBase, Hypertable are examples of column based database.

Document-Oriented:

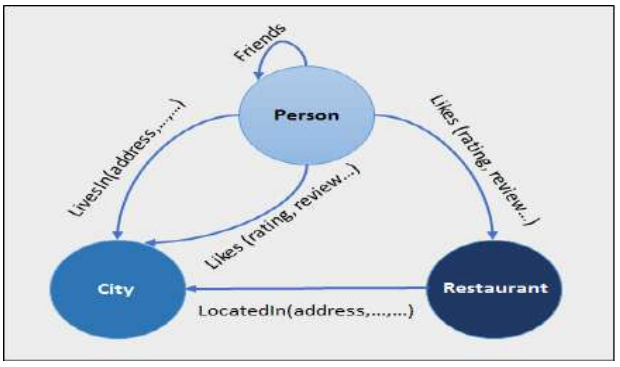
Document-Oriented NoSQL DB stores and retrieves data as a key value pair but the value part is

stored as a document. The document is stored in JSON or XML formats. The value is understood by the DB and can be queried.



Graph-Based

A graph type database stores entities as well the relations amongst those entities. The entity is stored as a node with the relationship as edges. An edge gives a relationship between nodes. Every node and edge has a unique identifier.



Experiment 6: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for The recordsremain

Inserting values into "Bus" table:

Insert into Bus values(1234,'hyderabad', ‘tirupathi'); Insert into Bus values (2345,’hyderabd’ ‘Banglore’); Insert into Bus values (23,'hyderabd','Kolkata'); Insert into Bus values (45,'Tirupathi,'Banglore'); Insert into Bus values (34,'hyderabd','Chennai');

Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,’M', ‘abc123'); Insert into Passenger values

(2, 78,'geetha', 36,'F','abc124'); Insert into Passenger values (45, 90,' ram', 30,'M','abc12'); Insert into Passenger values (67, 89,' ravi', 50,'M','abc14'); Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');

Few more Examples of DML commands:
Select * from Bus; (selects all the attributes and display) UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

Experiment 7: Querying
In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Practice the following Queries:
Display unique PNR_no of all Passengers. Display all the names of male passengers. Display the ticket numbers and names of all the passengers.
Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'. Find the names of passengers whose age is between 30 and 45.
Display all the passengers names beginning with 'A' Display the sorted list of passengers names

Experiment 8 and Experiment 9: Querying (continued...)
You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use UNION Operator.

Display the number of days in a week on which the 9W01 bus is available.
Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR_No.
Find the distinct PNR numbers that are present.
Find the number of tickets booked by a passenger where the number of seats is greater than 1.Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
Find the total number of cancelled seats.

Experiment 10: **Triggers**
In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.
Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger FOR EACH ROW BEGIN

IF NEW.Tickent N0 > 60 THEN SET New.Tickent no = Ticket
no; ELSE SET New.Ticket no = 0; END IF;
END;

Experiment 11: Stored Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: CREATE PROCEDURE myProc()
BEGIN
SELECT COUNT(Tickets) FROM Ticket WHERE age>=40; End;

Experiment 12: PL/SQL

In this session you are going to learn PL/SQL programs with Oracle Database

Experiment 13: DCL Commands

DCL commands are used to for granting the permissions for security of data within the users.

Reference Books:

1. Introduction to SQL,Rick F.Vander Lans,Pearson education..
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g,B lack Book, Dr.P.S.Deshpande, Dream Tech.
5. Ora cle D atab a se 11 g P L/S QL P ro gra m ming, M .M c Laughlin,TMH.
6. SQL Fundamentals, J.J.Patrick,Pearson Education.

Course Outcomes:

The students will be able:

- To design a database based on the requirements by applying ER and Relational model.
- To use normal forms for Schema Refinement and Transaction Management and SQL to interact with database to perform all types of DB operations.
- To analyze the business requirements and produce a viable model for the implementation of document oriented and distributed databases.
- To apply TCL and DCL Commands and to visualize all states of transaction operations.

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(R18A0507) DESIGN AND ANALYSIS OF ALGORITHMS

OBJECTIVES:

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- To understand the differences between tractable and intractable problems.
- To introduce P and NP classes.

UNIT - I

Introduction-Algorithm definition, Algorithm Specification, Performance Analysis-Space complexity, Time complexity, Randomized Algorithms.

Divide and conquer- General method, applications - Binary search, Merge sort, Quick sort, Strassen‘s Matrix Multiplication.

UNIT - II

Disjoint set operations, union and find algorithms, AND/OR graphs, Connected Components and Spanning trees, Bi-connected components

Backtracking-General method, applications- The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT - III

Greedy method- General method, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

UNIT - IV

Dynamic Programming- General Method, applications- Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.

UNIT - V

Branch and Bound- General Method, applications-0/1 Knapsack problem, LC Branch and Bound solution, FIFO Branch and Bound solution, Traveling sales person problem.

NP-Hard and NP-Complete problems- Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, Cook's theorem.

TEXT BOOKS:

4. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.
5. Design and Analysis of Algorithms, P. H. Dave, H.B.Dave,2nd edition, Pearson Education.

REFERENCE BOOKS

1. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons.
2. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ. Press
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education.
4. Foundations of Algorithms,, R. Neapolitan and K. Naimipour, 4th edition, Jones and Bartlett Student edition.
5. Introduction to Algorithms,3rd Edition, T. H. Cormen, C. E.Leiserson, R. L. Rivest, and C. Stein, PHI

Course Outcomes:

- Ability to analyze the performance of algorithms.
- Ability to choose appropriate algorithm design techniques for solving problems.
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.

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3 -/-/- 3

(R18A0513) PYTHON PROGRAMMING

OBJECTIVES:

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I

INTRODUCTION DATA, EXPRESSIONS, STATEMENTS

Introduction to Python and installation, variables, expressions, statements, Numeric data types: Int, float, Boolean, string. Basic data types: list--- list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters. Tuple --- tuple assignment, tuple as return value, tuple methods. Dictionaries: operations and methods.

UNIT II

CONTROL FLOW, LOOPS, FUNCTIONS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: statements break, continue.Functions--- function and its use, pass keyword, flow of execution, parameters and arguments.

UNIT III

ADVANCED FUNCTIONS, ARRAYS

Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Advanced Functions: lambda, map, filter, reduce, basic data type comprehensions.Python arrays: create an array, Access the Elements of an Array, array methods.

UNIT IV

FILES,EXCEPTIONS

File I/O, Exception Handling, introduction to basic standard libraries, Installation of pip, Demonstrate Modules: Turtle, pandas, numpy, pdb, Explore packages.

UNIT V

OOPS,FRAMEWORK

Oops concepts: Object, Class, Method, Inheritance, Polymorphism, Data abstraction, Encapsulation, Python Frameworks: Explore django framework with an example

OUTCOMES: Upon completion of the course, students will be able to

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist__, 2nd edition, Updated for Python 3, Shroff/O_Reilly Publishers, 2016.
2. R. Nageswara Rao, ‐Core Python Programming‖, dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

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(R18A0517) WEB TECHNOLOGIES

OBJECTIVES:

- Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.
- It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side
- Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications,
- Programming Common Gateway Interfaces, Programming the User Interface for the web applications

UNIT I:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.

HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) & its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (onclick, on submit, etc.,) and Form Validation.

UNIT II:

Introduction to XML: Document type definition, XML Schemas, Presenting XML , Introduction to XHTML, Using XML Processors: DOM and SAX.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Cookies and Session Tracking.

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database from a Servlet. Introduction to struts frame works.

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSP Declarations, Directives, Expressions, Scripting Elements, implicit objects.

Java Beans: Introduction to Beans, Deploying java Beans in a JSP page.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNITs 1, 2)
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITs 3, 4, 5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson Education, 2007.
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/ Pearson Education Asia.
3. Jakarta Struts Cookbook, Bill Siggelkow, S P D O' Reilly for chap 8.
4. March's beginning JAVA JDK 5, Murach, SPD
5. An Introduction to WEB Design and Programming – Wang-Thomson
6. PHP: The Complete Reference Steven Holzner Tata McGraw-Hill.

Course Outcomes:

1. Analyze a web page and identify its elements and attributes.
2. Create web pages using XHTML and Cascading Styles sheets.
3. Installation and usage of Server software's.
4. Database Connectivity to web applications
5. Build web applications using Servlet and JSP

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(R18A0464) EMBEDDED SYSTEMS

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1) To understand the basics of microprocessors and microcontrollers architecture and its functionalities
2) Understand the core of an embedded system
3) To learn the design process of embedded system applications.
4) To understands the RTOS and inter-process communication.

UNIT-I:

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS: 8086 Microprocessor:

Architecture of 8086, Register Organization, Programming Model, Memory Segmentation, Signal descriptions of 8086, Addressing modes, Instruction Set.

8051 Microcontroller: 8051 Architecture, I/O Ports, Memory Organization, Instruction set of 8051.

UNIT-II: INTRODUCTION TO EMBEDDED SYSTEMS:

History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, Applications of embedded systems, and characteristics of embedded systems, Operational and Non-operational attributes of embedded systems.

UNIT-III: TYPICAL EMBEDDED SYSTEM

Core of the embedded system, Sensors and actuators, Onboard communication interfaces-I2C, SPI, parallel interface**;** External communication interfaces-RS232, USB, infrared, Bluetooth, Wi-Fi, ZigBee, GPRS.

UNIT-IV: EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT-V EMBEDDED PROGRAMMING CONCEPTS

Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ & JAVA

TEXT BOOKS:

1. Embedded Systems, Raj Kamal, Second Edition TMH.
2. Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., CengageLearning
3. Introduction to Embedded Systems - shibu k v, Mc Graw HillEducation.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, TMH, 2nd Edition 2006
2. Embedded Systems- An integrated approach - Lyla B Das, Pearson education 2012.

COURSE OUTCOMES:

After going through this course the student will be able to

1) The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2) Understand and design the Embedded systems
3) Understand Embedded Firmware design approaches
4) Learn the basics of RTOS

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((R18A1203) KNOWLEDGE MANAGEMENT
(Professional Elective 1)

OBJETIVES:

The students will be able to

- define the links between Knowledge Management, organizational learning, innovation and creativity
- understand the fundamental elements of Knowledge Management
- learn knowledge management objectives in projects across diverse fields

UNIT I

Introduction – KM Life Cycle – Types of Knowledge -Approaches in Organizations -Five components of learning organization- Knowledge Sources.

UNIT II

Essentials of Knowledge Management Tools-Knowledge Creation Process – Knowledge Management Techniques.

UNIT III

Organizational Knowledge Management- Architecture and Implementation Strategies- Building the Knowledge Corporation- Implementing Knowledge Management in organization

UNIT IV

Knowledge Management System Life Cycle- Managing Knowledge Workers- Knowledge Audit- Knowledge Management Practices in Organizations- Case studies

UNIT V

Futuristic KM: Knowledge Engineering- Theory of Computation, Data Structure

TEXT BOOK:

1. Elias.M. Award & Hassan M. Ghaziri – –Knowledge Management‖ Pearson Education 2003.
2. Knowledge Management – a resource book – A Thohothathri Raman, Excel, 2004.
3. Knowledge Management- Elias M. Awad Hasan M. Ghazri, Pearson Education

REFERENCES:

1 Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, –Knowledge Engineering and Management‖, Universities Press, 2001.

2 C.W. Holsapple, –Handbooks on Knowledge Management‖, International Handbooks on Information Systems, Vol 1 and 2, 2003

Course Outcomes:

The students will :

- Analyze and define the links between Knowledge Management, organisational learning, innovation and creativity
- Analyze the fundamental elements of Knowledge Management
- Examine and evaluate how leadership can be used to facilitate a human infrastructure to diffuse knowledge and enable best practice.
- Apply Knowledge Management objectives in projects across diverse fields

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3	-/-/-	3

(R18A0519) COMPUTER GRAPHICS
(Professional Elective 1)

OBJECTIVES:

- To make students understand about fundamentals and applications of Graphics.
- To learn and understand 2 D and 3 D transformations and related algorithms.
- To enable them to design animated scenes for virtual object creations.
- To make the students present the content graphically.

UNIT-I:

Introduction: Application areas of Computer Graphics, overview of graphics systems, video- display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

UNIT-II:

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm

UNIT-III:

object representation : Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.3-D viewing : Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-IV:

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

UNIT-V:

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

TEXT BOOKS:

1. –Computer Graphics C version‖, Donald Hearn and M.Pauline Baker, Pearson Education
2. –Computer Graphics Principles & practice‖, second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

REFERENCES:

1. Computer Graphics‖, second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. Computer Graphics Second edition‖, Zhigand xiang, Roy Plastock, Schaum‘s outlines, Tata Mc-Graw hill edition.
3. rocedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. Principles of Interactive Computer Graphics‖, Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

Outcomes:

- Students can animate scenes in entertainment.
- Development of simple graphics applications.
- Ability to work in computer aided design for content presentation.
- Better analysis of data with pictorial representation.

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3 -/-/- 3

Professional Elective-1

(R18A1205)ARTIFICIAL INTELLIGENCE

Course Objectives: To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents **Basic Search Strategies**: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning

Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non- monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice- Hall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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- -/3/- 1.5

(R18A0588) PYTHON PROGRAMMING LAB

OBJECTIVES

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS

1. Write a program to Compute the GCD of two numbers.
2. Write a program to find the square root of a given number
3. Write a program to find sum of given number
4. Write a program to Find the maximum number in given List
5. Write a program to find an element in given list
6. Write a program for Selection sort and Insertion sort
7. Write a program for Merge sort in given list
8. Write a program to first n prime numbers in given list
9. Write a program for matrix Multiplication
10. Write a program to find word count in given string
11. Write a program to Find the most frequent words in a text read from a file
12. Simulate bouncing ball using Pygame

PLATFORM NEEDED Python 3 interpreter/Anaconda 3 or above for

Windows/Linux

OUTCOMES Upon completion of the course, students will be able to

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python

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-	-/3/-	1.5

(R18A0589) WEB TECHNOLOGIES LAB

OBJECTIVES:

- To enable the student to program web applications using the following technologies HTML, Javascript ,XML, PHP ,Tomcat Server, Servlets ,JSP, Beans and Struts.

Week 1

Design the following static web pages required for an online book store web site.

1) HOME PAGE: The static home page must contain three **frames**.

2) LOGIN PAGE

3) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.

4) REGISTRATION PAGE

Week 2

Develop and demonstrate the usage of inline, internal and external style sheet using CSS.

Week 3

Write JavaScript to validate the following fields of the Registration page.

1. **First Name** (Name should contains alphabets and the length should not be less than 6 characters).
2. **Password** (Password should not be less than 6 characters length).
3. **E-mail id** (should not contain any invalid and must follow the standard pattern name@domain.com)
4. **Mobile Number** (Phone number should contain 10 digits only).
5. **Last Name and Address** (should not be Empty).

Week 4

Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on Display Date button using onclick( )
function Output: Display **date** in the textbox

b) Input: A number n obtained using **prompt**
Output: **Factorial** of n number using **alert**

Week 5

a) Input: A number n obtained using **prompt**
Output: A **multiplication table** of numbers from 1 to 10 of n using **alert**

b) Input: A number n obtained using **prompt** and add another number using **confirm**

Output: **Sum** of the entire n numbers using **alert**

Week 6

Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

Week 7

Write an XML file which will display the Book information which includes the following:

1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a **Document Type Definition (DTD)** to validate the above XML file. Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically

Week 8

Develop and demonstrate PHP Script for the following problems:

a) Write a PHP Program to display current Date, Time and Day.
b) Write a PHP Script to check whether the given number is Palindrome or not
c) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with ―Hello <name>, you are not authorized to visit the site‖ message, where <name> should be replaced with the entered name. Otherwise it should send ―Welcome <name> to this site‖ message.

Week 9

Implement the following web applications using Servlets

(i) A web application that takes a name as input and on submit it shows a hello <name> page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name > message with the duration of usage (hint: Use session to store name and time).

(i) Write a PHP Program to display current Date, Time and Day.
(i) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with ―Hello <name>, you are not authorized to visit the site‖ message, where <name> should be replaced with the entered name. Otherwise it should send ―Welcome <name> to this site‖ message.
(iv) A web application that lists all cookies stored in the browser on clicking ―List Cookies‖ button. Add cookies if necessary.

Week 10
Execute simple queries with Database using (a) PHP, (b) Servlets

Week 11
Implement the following web applications using JSP
(i) Write a PHP Program to display current Date, Time and Day.
(ii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with ―Hello <name>, you are not authorized to visit the site‖ message, where <name> should be replaced with the entered name. Otherwise it should send ―Welcome <name> to this site‖ message.
(iii) Write a program for deploying **Java Beans** in a JSP page.

Week 12
Write a program to design a simple calculator using (a) JavaScript (b) PHP (c) Servlet and (d) JSP.

TEXT BOOKS:
1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages —Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web — How to program, Dietel and Nieto, Pearson.

Outcomes:

- Use WAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

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(R18A0006) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students‘ communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

The textbook prescribed for study is a manual that has been compiled by the department of English to meet the academic and professional needs of the students.

UNIT I – Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT 2 - Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT 3 – Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT 4 - Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT 5 - Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCES:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London,2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies.

OPENELECTIVE–II

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OPEN ELECTIVE II

(R18A1251) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

- To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
- To learn how to plan for information systems &implementation
- To study about security aspects of information systems

UNIT-I:

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

UNIT-II:

Business Applications of Information Systems : E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

UNIT-IV:

Building of Information Systems: System Development Stages, System Development Approaches.

Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.

Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V:

Introduction to Cyber Crime : Cyber Crime Defination and orgin of the word, cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and indian ITA 2000, Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOKS

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCES:

1. Nina Godbole & Sunit Belapure ― Cyber Security‖ Wiley india 2012.
2. Jawadekar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka –Cases in Management Information system _Everest, 2012.
4. A K Gupta, Sharma –Management of Systems‖ Macmillan, 2012.
5. Sandra Senf –Information Technology Control and Audit‖ 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP - https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) - https://magento.com/
8. Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS - http://www.lumina.com
10. OpenRules – Business Rules and Decision Management system - http://openrules.com/

COURSE OUTCOMES:

1) Ability to apply Concepts & applications of Management Information Systems.
2) Ability to perform Information Systems Planning & Implementations.
3) Ability to adapt Cyber crime and information security procedures.

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OPEN ELECTIVE II
(R18A0552) INTRODUCTION TO JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

1) to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
2) use data types, arrays and strings;
3) implement error-handling techniques using exception handling,
4) create and event-driven GUI using AWT components.

UNIT I: OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.
Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, Buffered Reader class, Scanner class, String Tokenizer class, inner class.

UNIT II: Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.
Polymorphism – Dynamic binding, method overriding, abstract classes and methods.
Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.
Packages- Defining, creating and accessing a package, importing packages.

UNIT III: Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.
Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV: Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Event Handling: Events, Handling mouse and keyboard events, Adapter classes.
Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V: GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT controls: Labels, button, text field, check box, and graphics. **Layout Manager –** Layout manager types: border, grid and flow. **Swing** – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

COURSE OUTCOMES:

1) An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high level language;
3) An appreciation of the principles of object oriented programming;
4) An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
5) Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
6) Be able to make use of members of classes found in the Java API.
7) Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.
8) Able to develop applications using Applet, awt and GUI Programming.

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OPEN ELECTIVE II
(R18A01252) SOFTWARE PROJECT MANAGEMENT

OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1) Understanding the specific roles within a software organization as related to project and process management
2) Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3) Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

UNIT-I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases .

UNIT-III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

Flows of the Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

Text Books:

1. Walker Royce, –Software Project Management‖, 1998, PEA.
2. Henry, –Software Project Management‖, Pearson.

Reference Books:

1. Richard H.Thayer.‖ Software Engineering Project Management‖, 1997, IEEE Computer Society.
2. Shere K.D.: –Software Engineering and Management‖, 1998, PHI.
3. S.A. Kelkar, –Software Project Management: A Concise Study‖, PHI.
4. Hughes Cotterell, –Software Project Management‖, 2e, TMH. 88 5. Kaeron Conway, –Software Project Management from Concept to D

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

1) Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
2) Compare and differentiate organization structures and project structures.
3) Implement a project to manage project schedule, expenses and resource with the application of suitable project management tools

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OPEN ELECTIVE II

(R18A0353) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1) To know the basics of ERP
2) To understand the key implementation of ERP
3) To know the business modules of ERP
4) To evaluate the current and future trends in ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, ‖ERP Demystified‖, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition, 2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, ‖Concepts in Enterprise Resource Planning‖, Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

1. To know the strategic importance of Enterprise Resource Planning
2. To Understand and implement ERP in various Sectors.

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OPEN ELECTIVE II

(R15A0354) NANO TECHNOLOGY

COURSE OBJECTIVES:

- To learn about basis of Nano Materials.
- In this course we focus on synthetic aspects for the design of nanostructured materials.
- We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.
- The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes(CNT), metal and metal oxide nanoparticles, core- shell nanostructures and self assembly of these nanostructures.
- The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles, nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano-composites,

UNIT-II

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

Electrical properties: Switching glasses with nano particles, Electronic conduction with nano- particles.

Optical properties: Optical properties, special properties and the coloured glasses.

Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT–III

Synthesis Routes: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV

Tools to Characterize Nanomaterials: X-Ray Diffraction (XRD), Small Angle X-ray

scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT–V

Applications of Nanomaterials: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1. Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press-IIM.
2. Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
3. Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press 2004.

REFERENCES BOOKS:

1. Nano: The Essentials by T. Pradeep, McGraw- Hill Education.
2. Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.
3. Transport in Nano structures- David Ferry, Cambridge University press 2000
4. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H. Carola.
5. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6. Electron Transport in Mesoscopic systems – S. Dutta, Cambridge University press.
7. Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

COURSE OUTCOMES:

1. Will familiarize about the science of Nano Technology.
2. Will demonstrate the preparation of Nano Technology.
3. Will develop knowledge in characteristic Nano Technology & Nano Materials.

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(R18A0518) COMPUTER NETWORKS

OBJECTIVES:

- To introduce the fundamentals of computer networks.
- To demonstrate the framework of TCP/IP & OSI model.
- To know the role of various protocols in Networking.
- To learn the detailed functioning of various network layers.

UNIT - I:

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet.

Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II:

Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols

Multiple Access Protocols - ALOHA, CSMA,CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms,

IP addresses, CIDR, Subnetting, SuperNetting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV:

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm

UNIT - V: Application Layer- Introduction, providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; RSA algorithm.

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

Outcomes:

- Exploration of the various Computer Networks, Protocols and routing algorithms.
- Students will be in a position to understand the World Wide Web concepts and the need for network security.
- Ability to administrate a network and flow of information.

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(R18A0524) DATA WAREHOUSING AND DATA MINING

OBJECTIVES:

- Study data warehouse principles and its working.
- Learn data mining concepts and understand association rules mining.
- Study classification algorithms
- Gain knowledge of how data is grouped using clustering techniques.

UNIT-I

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi- Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact- Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

UNIT-II

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration &Transformation, Data Reduction, Discretization and Concept Hierarchy Generation**.**

UNIT-III

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT-IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

Prediction: Accuracy and Error measures. Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

UNIT-V

Cluster Analysis : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods,

Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model based Clustering Methods, Outlier Analysis.

TEXT BOOKS:

1) Data Mining- Concepts and -1.chniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.

2) Introduction to Data Mining, Psng-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Educatior.

REFERENCE BOOKS:

1) Data Mining Techniques, Arun KPujari, 3rd Edition, Universities Press.
2) Data Warehousing Fundament's, Pualraj Ponnaiah, Wiley Student Edition.
3) The Data Warehouse Life CycleToolkit — Ralph Kimball, Wiley Student Edition.
4) Data Mining, Vikaram Pudi, P Rddha Krishna, Oxford University Press

Outcomes:

- Comparison of functional differences between data warehouse and database systems.
- Ability to perform the pre-processing of data and apply mining techniques on it.
- Capability to identify the association rules, classification and clusters in large data sets.
- Skills to solve real world problems in business and scientific information using datamining

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(R18A0525)LINUX PROGRAMMING

OBJECTIVES:

- To develop the skills necessary for Unix systems programming including file system programming, process and signal management, and inter process communication.
- To make effective use of Unix utilities and Shell scripting language such as bash.
- To develop the basic skills required to write network programs using Sockets.

UNIT I

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Sed-Scripts, Operation, Addresses. A**wk**- Execution, Fields and Records, Scripts, Operation, Patterns, Actions.

Shell programming with Bourne again shell(bash)- Introduction, shell responsibilities, pipes and

Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

UNIT II

Files and Directories- File Concept, File types, File System Structure, file metadata-Inodes, kernel support for files, system calls for file I/O operations- open, create, read, write, close, lseek, dup2,file status information-stat family, file and record locking-lockf and fcntl functions, file permissions - chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links – symlink, link, unlink.

Directories-Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Scanning Directories-opendir, readdir, closedir, rewinddir, seekdir, telldir functions.

UNIT III

Process – Process concept, Kernel support for process, process identification, process hierarchy, process states, process control - process creation, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family.

Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, kill, raise , alarm, pause, abort, sleep functions.

UNIT IV

Interprocess Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, **pipes**-creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs (Named pipes),differences between unnamed and named pipes, popen and pclose library functions.

Message Queues- Kernel support for messages, APIs for message queues, client/server example.

Semaphores-Kernel support for semaphores, APIs for semaphores.

UNIT V

Shared Memory- Kernel support for shared memory, APIs for shared memory, shared memory example.Comparison of IPC mechanisms.

Sockets- Introduction to Berkeley Sockets, Client-Server model, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006.
3. Unix Network Programming, W.R.Stevens, PHI

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD, rp-2007.
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson2003,
3. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson .
4. System Programming with C and Unix, A.Hoover, Pearson.

Outcomes:

1. Identify and use Linux utilities to create and manage simple file processing operations
2. Develop shell scripts to perform more complex tasks.
3. Illustrate file processing operations such as standard I/O and formatted I/O.
4. Generalize Signal generation and handling signals.
5. Develop client server Inter Process Communication (IPC) Mechanisms.
6. Illustrate multithreading concepts to reduce the wastage of CPUtime.

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(R18A0520) DISTRIBUTED SYSTEMS
(Professional Elective 2)

Objectives:

- To learn the principles and programming models used in distributed systems.
- To know the concept of IPC
- To understand the framework of DFS and DSM.
- To be aware of the concept of Distributed transaction.

UNIT I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges.

System models: Introduction, Architectural and Fundamental models, networking and Internetworking.

UNIT II

Time and Global States: Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global States.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT III

Inter process Communication: Introduction ,The API for the Internet Protocols, External Data Representation and Marshalling, Client –Server Communication, Group Communication, Case Study: IPC in UNIX.

Distributed Objects and Remote Invocation: Introduction, Communication between distributed objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT IV

Distributed File Systems: Introduction, File Service Architecture, Case Study 1: Sun Network File System.

Name Services: Name Services: Introduction, Name Services and the Domain Name System, Case study of the Global Name Service

Distributed Shared Memory: Introduction, Design and Implementation issues, Sequential consistency , Release consistency , Other consistency models.

UNIT V

Transactions and Concurrency control: Introduction, Transactions, Nested Transactions, Locks, optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2009.

REFERENCES:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor & Fransis Group, 2007.

Course Outcomes:

1. Identification and analysis of the core concepts of distributed systems. 2.To design and implement sample distributed systems.
3. To examine state-of-the-art distributed systems.

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III Year B.Tech. IT - II Sem **LT/P/D C**

3 -/-/- 3

(R18A0521) CYBER SECURITY
(Professional Elective 2)

Course objectives:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

Course Outcomes: The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy.

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.
Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data

linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley

2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&F Group.

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III Year B.Tech. IT - II Sem

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(R18A0527) MOBILE COMPUTING
(Professional Elective 2)

Course Objectives:

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol.
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

UNIT – I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT – II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT – III

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT – IV

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

UNIT – V

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.
Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1.Jochen Schiller, ‐Mobile Communications‖, Addison-Wesley, Second Edition, 2009. 2.Raj Kamal, ‐Mobile Computing‖, Oxford University Press, 2007, ISBN: 0195686772.

REFERENCE BOOKS:

1. Jochen Schiller, ‐Mobile Communications‖, Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, ‐Handbook of Wireless Networks and Mobile Computing‖, Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, ‐Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML‖, ISBN: 0521817331, Cambridge University Press, Oct 2004.

Course Outcomes:

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

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- -/3/- 1.5

(R18A1281)DATAWARE HOUSING & DATAMINING LAB

OBJECTIVES:

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

LIST OF EXPERIMENTS:

Experiments using Weka & Clementine Tools

1. Data Processing Techniques :
   (i) Data cleaning (ii) Data transformation - Normalization (iii) Data integration
2. Data Warehouse schemas – star, snowflake, fact constellation
3. Data cube construction – OLAP operations
4. Data Extraction, Transformations & Loading operations
5. Implementation of Attribute oriented induction algorithm
6. Implementation of apriori algorithm
7. Implementation of FP – Growth algorithm
8. Implementation of Decision Tree Induction
9. Calculating Information gain measures
10. Classification of data using Bayesian approach
11. Classification of data using K – nearest neighbour approach
12. Implementation of K – means algorithm
13. Implementation of PAM algorithm

Outcomes:

- Ability to add mining algorithms as a component to the existing tools
- Ability to apply mining techniques for realistic data.

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	-	**-/3/-**	**1.5**

(R18A0590) LINUX PROGRAMMING LAB

OBJECTIVES:

- To write shell scripts to solve problems
- To implement some standard Linux utilities such as ls, cp etc using system calls.
- To develop network-based applications using C.

List of Sample Problems:

Week 1:

Practice File handling utilities, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Week 2:

a) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. Whenever the argument is a file it reports no of lines present in it.

b) Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

Week 3:

a) Write a shell script to list all of the directory files in a directory

b) Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.

c) Write a shell script to find factorial of a given number.

Week 4:

Write an awk script to count number of lines in a file that does not contain vowels

Write an awk script to find the no of characters ,words and lines in a file

Week 5:

Implement in c language the following Unix commands using system calls

a) cat b) ls c) Scanning Directories (Ex: opendir(), readdir(),etc.)

Week 6:

Write a C program that takes one or more file/directory names as command line input and reports following information

A) File Type B) Number Of Links

C) Time of last Access D) Read, write and execute permissions

Week 7:

a) Write a C program to implement kill(), raise() and sleep() functions.
b) Write a C program to implement alarm(), pause() and abort() functions.

Week 8:

a) Write a C program to create child process and allow parent process to display ―parent‖ and the child to display ―child‖ on the screen
b) Write a C program to create zombie process
c) Write a C program to illustrate how an orphan process is created

Week 9:

a) Write a C program that illustrate communication between two process using unnamed pipes
b) Write a C program that illustrates communication between two process using named pipes or FIFO.

Week 10:

a) Write a C program for File Locking.
b) Write a C program that receives a message from message queue and display them.

Week 11:

Write a C program that illustrates two processes communicating using Shared memory.

Week 12:

Write client server programs using c for interaction between server and client process using sockets

Outcomes:

- Ability to understand the Linux environment
- Ability to perform the file management and multiple tasks using shell scripts in Linux environment.

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2	-/-/-	-

(R18A0007) CONSTITUTION OF INDIA

INTRODUCTION

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it ―as one of the strongest court in the world‖.

This course ―Indian Constitution‖ has been designed to develop understanding of the Indian Constitution among the students.

Objectives:

- To enable the students to understand the constitution‘s origin and its power.
- To enable the students to analyze the political principles.
- To enable the students to be aware of their fundamental rights and duties.

The following course content is prescribed for this course.

UNIT –I

Meaning of constitution law and constitutionalism,
Historical perspective of the constitution of India ,
Salient features and characteristics of the constitution of India.

UNIT –II

Scheme of fundamental rights, The scheme of the fundamental duties and its legal status, The Directive Principles of State Policy- its importance and implementation.

UNIT –III

Federal structure and distribution of legislative and financial powers between the Union and the States , Parliamentary Form of Government in India-the constitution powers and status of the president of India,
Amendment of the Constitutional Powers and Procedure.

UNIT –IV

The historical perspectives of the constitutional amendments in India. Emergency provisions: National Emergency, President Rule, Financial Emergency Local self

government-Constitutional scheme in India.

UNIT –V

Scheme of fundamental Right to Equality, Scheme of fundamental Right to certain Freedom under Article 19, Scope of the Right to Life and Personal Liberty under Article21.

OUTCOMES:

Students will be able to:

- improve their knowledge about Indian constitution
- value their identity and exercise their fundamental rights.
- understand how differently government bodies function.

OPENELECTIVE–III

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	3	**-/-/-**	**3**

OPEN ELECTIVE III
(R18A0452) ROBOTICS & AUTOMATION

COURSE OBJECTIVES:

1) To study overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) To study in detail about Robotics and sensors.
3) To study about AVR RISC Microcontroller architecture in detail.
4) To study about ARM Processor in detail.
5) To study about Artificial Intelligence in Robotics.

UNIT -I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

The AVR RISC microcontroller architecture: Introduction , AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory ,EEPROM ,I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM Processor: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

[1] Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning

[2]Stuart Russell, Peter Norvig, ‐Artificial Intelligence: A modern approch‖, Pearson Education,
India2003.

[3]ARM System Developer‘s Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

[1] M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.

[2] Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech

[3] Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to

1) Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) Understand in detail about Robotics and sensors.
3) Understand AVR RISC Microcontroller architecture in detail.
4) Understand about ARM Processor in detail.
5) Understand about Artificial Intelligence in Robotics.

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III Year B.Tech. II Sem **L T/P/D C**

3 -/-/- 3

OPEN ELECTIVE III

(R18A0453) INTERNET OF THINGS & ITS APPLICATIONS

COURSE OBJECTIVES:

- To study IoT Networking Core
- To study IoT related network fundamentals
- To study IoT Architecture.
- To study IoT Application Development procedure
- To study various case studies and IoT applications.

Unit 1: The IoT Networking Core :

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

Unit 2: Network Fundamentals:

Overview and working principle of Wired Networking equipment‘s – Router, Switches, Overview and working principle of Wireless Networking equipment‘s – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

Unit 3: IoT Architecture:

History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis. The Architecture The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

Unit 4: IoT Application Development:

Application Protocols MQTT, REST/HTTP, CoAP,
MySQL. Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools

Unit 5: Case Study & IoT Applications:

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, ―Mobile Computing,‖ Tata McGraw Hill, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

At the end of the course, the student will be able to

1) Understand IoT Networking Core
2) Understand IoT related network fundamentals
3) Understand IoT Architecture.
4) Understand IoT Application Development procedure
5) Understand various case studies and IoT applications.

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(OPEN ELECTIVE - III)
(R18A1253) SOFTWARE TESTING TECHNIQUES

COURSE OBJECTIVES:

- Knowing the concepts of Software Engineering and software development life cycle.
- Understanding the foundations, techniques, and tools in the area of software testing and its practice in the industry.
- Learning the functional aspect of the various testing techniques.
- Knowledge of the creation of test cases and usage of testing tools.

UNIT – I INTRODUCTION

Software, Software Engineering, Process Models: Waterfall Model, Spiral Model, Prototyping, V Model. Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester – Independent Verification and Validation.

UNIT – II SOFTWARE TESTING REQUIREMENTS

Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews: Peer Review – Walkthrough - Inspection - Checklists of Review Process - Review Log.

UNIT – III TESTING TECHNIQUES

White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision/Branch Coverage – Basic Path Testing – Control Flow Graph Coverage – Conditional Coverage – McCabe‘s Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques: Boundary Value Analysis – Equivalent Class Partition – Cause-Effect Analysis – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.

UNIT – IV TESTING TYPES

Unit Testing, Functional Testing: Smoke Testing – Integration, System Testing, User Acceptance Testing - Non Functional Testing:– Performance Testing – Recovery Testing – Security Testing – Compatibility Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - Data ware House Testing and Business Intelligence Testing – SOA Testing - Mobile Testing.

UNIT – V TEST CASE DESIGN

Definition of Test Case - Standards, Guidelines and Naming Conventions – Characteristics of Good Test Cases – Test Case templates – Creation of Test Case – Requirement Coverage – Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting of Test Execution – Definition of Risk - Risk Based Testing Approach.

Overview of Testing Tools like Winrunner, Loadrunner, Selenium, JMeter.

TEXT BOOKS :

1. Software Testing Techniques – BorisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
3. S.Subashni, N.Satheesh Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, ‖Software Testing‖, Umayam Publications , First edition, 2013.

REFERENCE BOOKS:

1. Srinivasan Desikan, Gopalaswamy Ramesh,‖Software Testing: Principles and Practice‖, Pearson Education India, First Impression 2006.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing Concepts and Tools:P.NageshwarRao, dreamtechPress.
4. Art of Software Testing – Meyers, John Wiley.
5. Software Testing in the Real World – Edward Kit, Pearson.

COURSE OUTCOMES:

1) Analyze the strategies for software testing.
2) Identify the issues in test management and testing activity.
3) Apply the suitable testing strategy for a given application.
4) Development of test cases and selection of appropriate testing tool.

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OPEN ELECTIVE III
(R18A0355) TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

- To facilitate the understanding of Quality Management principles and process.
- To understand Customer focus, Employee focus and their involvement and Supplier Management.

UNIT – I

Introduction, The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

Customer Focus and Satisfaction: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q-90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOK:

- Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
- Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

- Beyond TQM / Robert L.Flood
- Total quality management by Paneer Selvam
- Statistical Quality Control / E.L. Grant.
- Total Quality Management:A Practical Approach/H. Lal
- Quality Management/Kanishka Bedi/Oxford University Press/2011
- Total Engineering Quality Management/Sunil Sharma/Macmillan

COURSE OUTCOMES:

1) The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
2) To give the students an overview of TQM, various Quality aspects and importance of Top Management Commitment in any organization for maintaining product / services quality.

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OPEN ELECTIVE III
(R18A0251) ELECTRICAL SYSTEMS & APPLICATIONS

COURSE OBJECTIVES:

- To introduce the fundamental concepts of electro mechanical energy conversion
- To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry

UNIT- 1: Electrical System Components

LT system wiring components, Selection of Cables, Wires, Switches, Distribution Box, Metering System, Tariff structure, Protection Components- Fuse, MCB, MCCB, ELCB, Inverse current characteristics, Symbols, Single Line Diagram (SLD) of a wiring system, Contactor, Isolator,Relays, MPCB, Electric shock and Electrical safety practices.

UNIT- 2: Residential and Commercial Electrical Systems

Types of residential and commercial wiring systems, general rules and guidelines for installation. Load calculation and sizing of wire, rating of main switch, distribution board and protection devices. Earthing system calculations.Requirements of commercial installation-deciding lighting scheme and number of lamps, earthing of commercial installation, selection and sizing of components.

UNIT- 3: Illumination Systems

Understanding various terms related to light intensity, Lumens, candle power, lamp efficiency,specific consumption.Various illumination schemes- Incandescent lamps, modern luminaries like CFL, LED and their operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

UNIT-4: Industrial Electrical Systems

UPS System-Types, Principle of operation.Battery banks, sizing the UPS and Battery Banks, Selection of UPS and Battery Banks.

UNIT-5: Single Phase AC Motor and Special Motors

Constructional features, Principle of operation, Characteristics, Speed control and Applications of Single phase AC motor, Stepper motor, Brushless DC motor and Universal motor(Qualitative Treatment only).

Text Books

1 S. L. Uppal and G. C. Garg, –Electrical Wiring, Estimating & Costing‖, Khannapublishers, 2008.

2 K. B. Raina, –Electrical Design, Estimating & Costing‖, New age International, 2007.

3 H. Joshi, –Residential Commercial and Industrial Systems‖, McGraw Hill Education, 2008.

REFERENCE BOOKS:

1 N.V. Suryanarayana, –Utilization of Electrical Power including Electric drives and Electric traction‖, New Age International (P) Limited Publishers, 1st Edition,1994.

2 E. Open Shaw Taylor, –Utilization of Electric Energy‖, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

1) Maintain/Troubleshoot various lamps and fittings in use.
2) Design Illumination systems for various applications.
3) Utilize effectively the electrical systems in industries.

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OPEN ELECTIVE III
(R18A0554) OPERATING SYSTEM CONCEPTS

OBJECTIVES:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management

Unit I:

Introduction, objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

Unit-II:

Process Management:

Process concept, Process states, threads, **CPU Scheduling** - Scheduling algorithms, multiple processors and real time scheduling. **Process synchronization** – Critical section problems, Peterson‘s Solution, semaphores, monitors.

Unit-III:

Memory Management:

Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation. **Virtual memory** – Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

Unit-IV: **File Management**: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

Unit-V:

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.

Dead locks: Characterization, Dead lock Prevention, Dead lock Avoidance, Dead lock Detection and Recovery.

Text Book:

1. Operating Systems Concepts –Avil Silberschatz j, Peter Galvin, GreyGagne

Reference:

1. Modern Operating Systems –Andrew S. Tanenbaum, PHI
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India

OUTCOMES:

At the end of the course the students are able to:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

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IV Year B.Tech IT – I Sem

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3	-/-/-	3

(R18A1206) PROGRAMMING FOR APPLICATION DEVELOPMENT

Course Objectives:

1. To get an overview of the various technologies, which can help in the implementation of the various live Project.
2. To Understand the Basic Concepts of C#
3. To Understand the Exception Handling Mechanisms
4. To Understand the Various Concepts of .net Assemblies

UNIT I:

MS.NET Framework Introduction: The .NET Framework - an Overview- Framework Components – Framework Versions-Types of Applications ,MS.NET Namespaces - MSIL / Metadata and PE files- Common Language Runtime (CLR) - Managed Code -MS.NET Memory Management / Garbage Collection -Common Type System (CTS) - Common Language Specification (CLS)- Types of JIT Compilers-Security Manager .

UNIT II:

Developing Console Application: Introduction to Project and Solution in Studio- Entry point method - Main. - Compiling and Building Projects -Using Command Line Arguments - Importance of Exit code of an application- Different valid forms of Main-Compiling a C# program using command line utility CSC.EXE-Data types - Global, Stack and Heap Memory- Common Type System-Reference Type and Value Type- Data types & Variables Declaration- Implicit and Explicit Casting-

UNIT III:

Object Oriented Programming: Object -Lifecycle of an Object-relationship between Class and Object-Define Application using Objects-Principles of Object Orientation-Encapsulation –Inheritance-Polymorphism- Encapsulation is binding of State and Behavior together-understand the difference between object and reference- Working with Methods, Properties - Copy the reference in another reference variable-

Exception Handling: Exception -Rules for Handling Exception - Exception classes and its important properties - Understanding & using try, catch keywords -Throwing exceptions-Importance of finally block- & quot ; using & quot; Statement -Writing Custom Exception Classes

UNIT IV:

Delegates And Events: Understanding the .NET Delegate type, defining a Delegate Type in C#, The System. Multicast Delegate and System. Delegate Base Classes, PROGRAMMING

WITH .NET ASSEMBLIES: Configuring .NET Assemblies, defining Custom Namespaces, The role of .NET Assemblies, Understanding the Format of a .NET assembly, Building and Consuming a Single-File Assembly, Building and Consuming a Multifile Assembly, Understanding Private Assembly, Understanding Shared Assembly, Consuming a Shared Assembly, Configuring Shared assemblies.

UNIT V:

ADO.NET PART - I: The Connected Layer: A High-Level Definition of ADO.NET, Understanding ADO.NET Data Provider, Additional ADO.NET Namespaces, The Types of the System.Data.namespace, Abstracting Data Providers Using Interfaces, Creating the Auto Lot Database. Library, Programming with LINQ to DataSet.

TEXT BOOKS:

1. Andrew Troelsen (2010), Pro C# and the .NET 4 Platform, 5th edition, Springer (India) Private Limited, New Delhi, India.

REFERENCE BOOKS:

1.E. Balagurusamy (2004), Programming in C#, 5th edition, Tata McGraw-Hill, New Delhi, India.

2. Herbert Schildt (2004), The Complete Reference: C#, Tata McGraw-Hill, New Delhi, India. 3.Simon Robinson, Christian N agel, Karli Watson, Jay Gl (2006), Professional C#, 3rd edition, Wiley & Sons,India.

Course Outcome:

Upon completion of the subject, students will be able to:

1. Implementation of Oops Concepts in ASP.net
2. Be able to Implement, Compile, Test & Run Applications Programs.
3. Demonstrate the ability to use Exception Handling Mechanisms.
4. Able to Develop Applications using Asp.net,C#.

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(R18A1207) MOBILE APPLICATION DEVELOPMENT

OBJECTIVES

- Mobile Application Development course exposes the students to essentials of mobile apps development.
- The core modules of this subject include designing, developing, testing, signing, packaging and distributing high quality mobile apps.
- This course aims to teach mobile app development using Android as the development platform.

UNIT I:

Introduction to Mobile A brief history of Mobile, The Mobile Ecosystem, Why Mobile?, Types of Mobile Applications, Mobile Information Architecture, Mobile Design, Mobile 2.0, Mobile Web development, Small Computing Device Requirements.

J2ME: Overview The World of Java, Inside J2ME, J2ME Architecture, MIDlet Programming, J2ME Wireless Toolkit, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite

UNIT II:

Introduction to Android: History of Android, Introduction to Android, Operating Systems, Android Development Tools, Android Architecture.

UNIT III:

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project –Hello Word, run on emulator, Deploy it on USB-connected Android device

UNIT IV:

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.

UNIT V:

Database: Understanding of SQLite database, connecting with the database.

TEXTBOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill
2. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.
3. Lauren Darcey and Shane Conder, ―Android Wireless Application Development , Pearson Education, 2nd ed. (2011)

REFERENCE BOOKS:

1. Reto Meier, ―Professional Android 2 Application Development , Wiley India Pvt Ltd
2. Mark L Murphy, ―Beginning Android , Wiley India Pvt Ltd
3. Sayed Y Hashimi and Satya Komatineni, ―Pro Android , Wiley India Pvt Ltd. devloper.android.com (web)
4. Android Application Development All in one for Dummies by Barry Burd, Edition: I
5. Teach Yourself Android Application Development In 24 Hours, Edition:I, Publication: SAMS

Outcomes:

- Upon completion of this course, student shall be able to:
- Appreciate the Mobility landscape
- Familiarize with Mobile apps development aspects
- Design and develop mobile apps, using Android as development platform, with key focus on user experience design, native data handling and background tasks and notifications.
- Perform testing, signing, packaging and distribution of mobile apps.
- The student can design and develop mobile application using J2ME

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(R18A0523) CLOUD COMPUTING

Objectives

:

1. To understand the various distributed system models and evolving computing paradigms.
2. To gain knowledge in virtualization of computerresources
3. To realize the reasons for migrating into cloud
4. To introduce the various levels of services that can be achieved by a cloud.
5. To describe the security aspects in cloud and the services offered by a cloud.

UNIT- I

Systems Modeling :**Distributed System Models and Enabling Technologies**- Scalable Computing over the Internet- System Models for Distributed and Cloud Computing- Software Environments for Distributed Systems and Clouds-- Performance, Security, and Energy Efficiency

Computer Clusters for Scalable Parallel Computing: Clustering- Clustering for Massive Parallelism-Computer Clusters and MPP Architectures-Design Principles of Computer Clusters-Cluster Job and Resource Management.

UNIT- II

Virtualization: Virtual Machines and Virtualization of Clusters and Data Centers- Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms-Virtualization of CPU, Memory, and I/O Devices-Virtual Clusters and Resource Management- Virtualization for Data-Center Automation

UNIT- III

Foundations: Introduction to Cloud Computing- Migrating into a Cloud-The Enterprise Cloud Computing Paradigm.

UNIT- IV

Infrastructure as a Service (IAAS) & Platform (PAAS): Virtual machines provisioning and Migration services-On the Management of Virtual machines for Cloud Infrastructures-Aneka—Integration of Private and Public Clouds

UNIT- V

Software as a Service (SAAS) & Data Security in the Cloud:

Google App Engine – Centralizing Email Communications- Collaborating via Web-Based Communication Tools-An Introduction to the idea of Data Security- The Current State of

Data Security in the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

TEXT BOOKS:

1. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
2. Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S.Tanurai Selvi, TMH, 2012.
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

Reference Books:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.

2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.

3. Cloud Computing: Implementation, Management and Security, John W.Rittinghouse, James F.Ransome, CRC Press, rp2012.

4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'reilly, SPD, rp2011.

5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

Outcomes:

1. To distinguish the different models and computing paradigms.
2. To explain the levels of virtualization and resources virtualization.
3. To analyze the reasons for migrating into cloud.
4. To effectively use the cloud services in various operating platforms.
5. To apply the services in the cloud for real world scenarios.

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3 -/-/- 3

(R18A1208) BUSINESS DATA ANALAYTICS

Objectives: The students will be able

- To understand the different types of data and analytics
- To learn the concept of Analytics for Business
- To learn the tools and technologies of big data

Unit I

Big Data Analytics

Types of Digital Data: structured, unstructured and semi-structured data. Big data from business Perspective: Introduction of big data, Characteristics of big data, Data in the warehouse, Importance of Big data, Big data Use cases: Patterns for Big data deployment – Big data Market Survey.

Unit II

Business Analytics

Introduction Business Analytics: What and Why Business Analytics, Business Analytics Importance, Resource Considerations to Support Business Analytics, Business Analytics Application, Align Resources to Support Business Analytics within an Organization.

Descriptive Analytics - Predictive Analytics - Prescriptive Analytics. Case Study Illustration - Final Business Analytics Case Problem

Unit III

Understanding Statistical Tools

Statistical Tools - Introduction, Counting, Probability Concepts, Probability Distributions, Statistical Testing, Linear Programming

Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem

Unit IV

Analytics and R programming

Introduction to R, RStudio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt,.csv etc. Outliers, Combining Datasets, R Functions and loops

Unit V

Applications of Analytics:

Analytics in business support functions –Case study analytics in HealthCare, Telecom and Retail. Anatomy of social media analytics- anatomy of recommendation based systems and Components of recommendation systems.

Machine Learning Algorithms :Association rule mining in R, K-means clustering in R, Decision tree in R

Text books:

1. Marc J.Schniederjans, Dara G. Schniederjans, Christopher M. Starkey –Business Analytics Principles, Concepts, and Applications‖ (What, Why, and How), Pearson.2014.
2. Fundamentals of Business Analytics ,‖R.N.Prasad & Seema Acharya,Wiley Publications, 2nd Edition,2016.

REFERENCE BOOKS:

1. Frank J Ohlhorst, ―Big Data Analytics: Turning Big Data into Big Money‖, Wiley and SAS Business Series, 2012.

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IV Year B.Tech IT – I Sem

L	T/P/D	C
3	-/-/-	3

(R18A0526) MACHINE LEARNING
(Professional Elective 3)

OBJECTIVES :

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

UNIT I

FOUNDATIONS OF LEARNING

Components of learning – learning models – geometric models – probabilistic models – logic models – grouping and grading – learning versus design – types of learning – supervised – unsupervised – reinforcement – theory of learning – feasibility of learning – error and noise – training versus testing – theory of generalization – generalization bound – approximation generalization trade off – bias and variance – learning curve

UNIT II

INTRODUCTION TO TECHNOLOGY LANDSCAPE

Linear classification – univariate linear regression – multivariate linear regression – regularized regression – Logistic regression – perceptron‘s – multilayer neural networks – learning neural networks structures – support vector machines – soft margin SVM – going beyond linearity – generalization and overfitting – regularization – validation.

UNIT III

DISTANCE-BASED MODELS

Nearest neighbor models – K-means – clustering around medoids – silhouttes – hierarchical clustering – k-d trees – locality sensitive hashing – non-parametric regression – ensemble learning – bagging and random forests – boosting – meta learning

UNIT IV

TREE AND RULE MODELS

Decision trees – learning decision trees – ranking and probability estimation trees – regression trees – clustering trees – learning ordered rule lists – learning unordered rule lists – descriptive rule learning – association rule mining – first-order rule learning

UNIT V

REINFORCEMENT LEARNING

Passive reinforcement learning – direct utility estimation – adaptive dynamic programming – temporal-difference learning – active reinforcement learning – exploration – learning an action utility function – Generalization in reinforcement learning – policy search – applications in game playing – applications in robot control.

Text Book:

1. P. Flach, –Machine Learning: The art and science of algorithms that make sense of data‖, Cambridge University Press, 2012. (UNIT-I to IV)
2. M. Mohri, A. Rostamizadeh, and A. Talwalkar, –Foundations of Machine Learning‖, MIT Press, 2012. (UNIT V)

Reference Book:

1. Y. S. Abu-Mostafa, M. Magdon-Ismail, and H.-T. Lin, –Learning from Data‖, AMLBook Publishers, 2012.
2. K. P. Murphy, –Machine Learning: A probabilistic perspective‖, MIT Press, 2012.
3. C. M. Bishop, –Pattern Recognition and Machine Learning‖, Springer, 2007.
4. T. M. Mitchell, –Machine Learning‖, McGraw Hill, 1997.
5. S. Russel and P. Norvig, –Artificial Intelligence: A Modern Approach‖, Third Edition, Prentice Hall, 2009.

Course outcomes:

At the end of the course students should be able to

- Able to Explain theory underlying machine learning
- Construct algorithms to learn linear and non-linear models
- Implement data clustering algorithms
- Construct algorithms to learn tree and rule-based models
- Apply reinforcement learning techniques

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IV Year B.Tech IT – I Sem **L T/P/D C**

3 -/-/- 3

(R18A0531) INTERNET OF THINGS
(Professional Elective 3)

Objectives:

1. To introduce the terminology, technology and its applications
2. To explain the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To elucidate the Raspberry PI platform, that is widely used in IoT applications
5. To explain the implementation of web based services on IoT devices

Unit I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

Unit II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

Unit III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling

Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

Unit V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs

Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web AP

Course Outcomes :

Upon completion of this course, students should be able to:

1. Explain the importance and usage of IOT.
2. Describe the various IOT levels and protocols.
3. Develop programs in Python.
4. Illustrate the functioning of IOT devices.
5. Relate IOT to cloud computing and web applications.

TEXT BOOK:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
3. www.universityupdates.in || www.android.universityupdates.in

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IV Year B.Tech IT – I Sem **L T/P/D C**

3 -/-/- 3

(R18A0522) SOFTWARE TESTING METHODLOGIES
(Professional Elective 3)

Objectives:

- To learn and understand the tools and techniques of software testing and its practice in the industry.
- To be aware of the differences between the various testing strategies.
- To know the taxonomy and purpose of software testing tools.

UNIT I:

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

UNIT II:

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Transaction Flow Testing: Transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT III:

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT IV:

Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing : Overview, decision tables, path expressions, kv charts, specifications.

UNIT V:

State, State Graphs and Transition testing : State graphs, good & bad state graphs, state testing, Testability tips. Graph Matrices and Application : Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. Basics of Regression testing (RTS).

TEXT BOOKS:

1. Software Testing techniques - Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCES:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

OUTCOMES:

1. Ability to test a process for continuous quality improvement
2. Generation of test cases from requirements
3. Analysis of Modeling techniques: UML: FSM and State charts, Combinatorial designetc. 4.Test generation from models.
5. Test adequacy assessment.

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IV Year B.Tech IT – I Sem **L T/P/D C**

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(R17A1282) PROGRAMMING FOR APPLICATION DEVELOPMENT LAB

WEEK 1

Learning to use Visual Studio 2010
IDE Building Console Application
Project

WEEK 2

Write a Program to generate the factorial of a given number by using command line argument
Write a Program to generate Fibonacci series
Write a program to generate the temperature conversion

WEEK 3

Write a program to generate Pascal Triangle .
Write a program which asks for a symbol and a width, and displays a triangle of that width, using that number for the inner symbol

WEEK 4

Write a program to find the second highest value in an array
Write a program that at accept an array and a number to be searched in an array if found display proper message and its position in a array

WEEK 5

Write a console program to develop tic-tac toe game
Create a function named "ChangeChar" to modify a letter in a certain position (0 based) of a string, replacing it with a different letter ex: ChangeChar(‒crush‖,2,‘a‘)

WEEK 6

1. Create a base class, Telephone, and derive a class ElectronicPhone from it. In Telephone, create a protected string member phonetype, and a public method Ring( ) that outputs a text message like this: "Ringing the <phonetype>." In ElectronicPhone, the constructor should set the phonetype to "Digital." In the Run( ) method, call Ring( ) on the ElectronicPhone to test the inheritance.

2. Extend above Exercise to illustrate a polymorphic method. Have the derived class override the Ring( ) method to display a different message

3. Change the Telephone class to abstract, and make Ring( ) an abstract method. Derive two new classes from Telephone: DigitalPhone and TalkingPhone. Each derived class should set the phonetype, and override the Ring( ) method.

WEEK 7

1. Write a program to create interface named test. In this interface the member function is square. Implement this interface in arithmetic class.Create one new class called ToTestInt in this class use the object of arithmetic class.
2. Create an outer class with a function display, again create another class inside the outer class named inner with a function called display and call the two functions in the main class.

WEEK 8

1. Write a program for example of try and catch block. In this check whether the given array size is negative or not.
2. Write a program to illustrate usage of try multiple catch with finally clause

3. Write a program for creation of user defined exception to show whether candidate is eligible to caste vote .

WEEK 9

1. Create a console application that displays current date a time for 10 times with the time interval of 2 seconds(use sleep() method

2. Write a program that demonstrates a high-priority thread using Sleep to give lower-priority threads a chance to run.

WEEK 10

1. create a console application to implement delegate.Create a delegate called strMyDel that takes one string parameter and returns a string.create a class named TestDelegate that contains two non-static methods space() and reverse() having following signature:String Space(String str); space between input characters String Reverse(String str); - reverse the given string
2. Create a console application to get two integer numbers from user and perform addition and multiplication on the input numbers.use the concept of MultiCastEvent

WEEK 11

1. Create a console application to deploy on global assemble cache(using gacutil)

2. Create a bank namespace with various classes (Saving , Current) and implement the namespace in another application

WEEK 12

Create a program to ask the user for data about books (title, author, gender and summary) and store them in a SQLSERVER database

Write a program to update books details using sql procedures

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(R18A1283) MOBILE APPLICATION DEVELOPMENT LAB

List Of Experiments

1. Installation of Java Wireless Toolkit(J2ME)
2. Development Of Hello World Application
3. Development of Menu Creation Application
4. Generation of Menu Events Handling Application
5. Development of Slide Show Application
6. Generation of Image Slide Show
7. Development of Quiz & RMS Application
8. Application for Input Checking
9. Generation of Bar Graph
10. Generation of Pie Chart
11. Client Server App using Datagram
12. Login using Http Connection

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	3	-/-/-	3

(R18A1209) TOOLS AND TECHNIQUES OF DATA SCIENCES

Course Objectives

- To understand the various stages in Data science process.
- To learn how to setup the environment and implement in Python and R
- To learn to write programs in Python and R for data science projects.

UNIT - I

Introduction to Data Sciences – The data science process – Roles in data science project – Stages of Data Science Project – Defining the goal – Data collection and Management – Modelling – Model evaluation – Presentation and documentation – Model deployment and Maintenance

Applying Data science in Industry – Benefits from Business centric Data Science – Data Analytics and Types – Common Challenges in Analytics – Distinguishing between Business Intelligence and Data Science

Using Data Science to Extract meaning from Data – Machine learning – Math Probability and Statistical Modelling – Using clustering to subdivide data – Modeling with instances – Building models that operate on IOT

UNIT-II

Datascience tools environment - Python – overview - Setting up Data science toolbox, Essential concepts and tools-Obtaining Data – creating reusable command line tools – scrubbing data – Managing your Data workflow – Drake - Exploring Data – Parallel pipelines – Modeling Data.

UNIT – III

Techniques using Python Tools -Linear Algebra – Statistics – Probability – Hypothesis and Inference – Gradient Descent – working with Data – Machine Learning – k – Nearest Neighbours – Naive Bayes – Simple Linear Regression – Multiple Regression – Logistic Regression

UNIT-IV

Techniques using R Tools - R programming overview - Loading data into R – Modeling methods – choosing and evaluating models – Memorization methods - Linear and logistic Regression – Unsupervised methods – Delivering results – Documentation and Deployment.

UNIT-V

Data Manipulation and visualization – Data manipulation using pandas – visualization using matplotlib.

TEXT BOOKS:

1. J. Janssens, Data science at the command line, First edition. Sebastopol, CA: O'Reilly, 2014..
2. J. Grus, Data Science from Scratch: First Principles with Python, 1 edition. Sebastopol, CA: O'Reilly Media, 2015.
3. N. Zumel and J. Mount, Practical data science with R. Shelter Island, NY: Manning Publications Co, 2014.

REFERENCE BOOKS:

1. L. Pierson and J. Porway, Data science, 2nd edition. Hoboken, NJ: John Wiley and Sons, Inc, 2017.
2. C. O'Neil and R. Schutt, Doing Data Science: Straight Talk from the Frontline, 1 edition. Beijing ; Sebastopol: O'Reilly Media, 2013.
3. J. VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, First edition. Shroff/O'Reilly, 2016.
4. S. R. Das, Data Science: Theories, Models, Algorithms, and Analytics. . https://srdas.github.io/MLBook/.

Course Outcomes:

Students will be able to

- Demonstrate the basic knowledge of data science process.
- Setup the software environment for python and R Lanaguage and apply various techniques to work with data.
- Manipulate and visualize the data using tools like pandas and matplotlib.

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3 -/-/- 3

(R18A0535) IMAGE PROCESSING
(Professional Elective 4)

Course Objectives:

- To comprehend the relation between human visual system and machine perception and processing of digital images.
- To provide a detailed approach towards image processing applications like enhancement, segmentation, and compression.

UNIT – I:

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT – II:

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering. Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT – III:

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT – IV:

Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation. Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT – V:

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

- Digital Image Processing – Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
- Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- MC GRAW HILL EDUCATION, 2010.

REFERENCE BOOKS:

- Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools – Scotte Umbaugh, 2nd Ed, CRC Press, 2011
- Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, MC GRAW HILL EDUCATION, 2010.
- Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
- Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition

Course Outcomes:

- Exploration of the limitations of the computational methods on digital images.
- Expected to implement the spatial and frequency domain image transforms on enhancement and restoration of images.
- Elaborate understanding on image enhancement techniques.
- Expected to define the need for compression and evaluate the basic compression algorithms.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech IT – II Sem **L T/P/D C**

3 -/-/- 3

(R18A1210) ADHOC AND SENSOR NETWORKS

(Professional Elective 4)

Objectives:

The objective of this project is to test and evaluate the performance of MANET for safety communications and tactical operations. In particular, by providing diversity cooperative transmission can indeed increase throughput as well as transmission coverage. In this study we will specifically concentrate on the synchronization aspects of cooperative transmission, which is one of the major issues in its application to multi-hop transmission in wireless ad-hoc network environments..

UNIT – I

Introduction to Ad Hoc Wireless Networks: Characteristics of MANETS, Applications of MANETS, Challenges Routing In MANETS: Topology based versus position based approaches, Topology based routing protocols, and position based routing, other routing protocols

UNIT – II

Data Transmission In MANETS: The broadcast storm, Multicasting, Geo casting. TCP Over Ad Hoc Networks: TCP protocol overview, TCP and MANETS, Solutions for TCP over Ad Hoc

UNIT – III

Basics Of Wireless Sensors And Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy Consumption, Clustering of Sensors, Applications. Data Retrieval In Sensor Networks: Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

UNIT – IV

Security: Security in Ad Hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems Sensor Network Platforms and Tools: Sensor network Hardware, Sensor Network Programming Challenges, and Node-Level Software Platforms.

UNIT – V

Operating System-Tiny OS: Imperative Language: nesC, Data flow style language: TinyGALS, Node- Level Simulators, NS-2 and its sensors network extension, TOSSIM.

Text Books:

1. Ad Hoc and Sensor Networks: Theory and Applications, Carlos de Morais Cordeiro and Dharma Prakash Agrawal, World Scientific Publications / Cambridge UniversityPress,2006.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005.

References:

1. Ad Hoc Wireless Networks: Architectures and Protocols, C. Siva Ram Murthy and B. S. Manoj, Pearson Education, 2004.
2. Guide to Wireless Ad Hoc Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2011.
3. Guide to Wireless Sensor Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2012.
4. Wireless Mesh Networking, Thomas Krag and Sebastin Buettrich, O'Reilly Publishers,2007.
5. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010.
6. Wireless Ad hoc Mobile Wireless Networks-Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
7. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chee Tseng, Auerbach Publications, Taylor & Francis Group, 2007
8. Wireless Ad hoc and Sensor Networks–Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp2010.
9. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications /Cambridge University Press, 2010

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech IT – II Sem **L T/P/D C**

3 -/-/- 3

(R18A0528) SERVICE ORIENTED ARCHITECTURE

(Professional Elective 4)

OBJECTIVES:

- The student should be made to:
- Learn XML fundamentals.
- Be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

UNIT I:

Introduction to XML : XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema X-Files.

UNIT II

Building XML- Based Application Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML.

UNIT III

Service oriented Architecture Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

UNIT IV

Web Services Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message

Exchange Patterns – Orchestration – Choreography –WS Transactions.

UNIT V

Building SOA-Based Application Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines - Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE.

TEXTBOOKS:

1.Ron Schmelzer et al. ―XML and Web Services‖, Pearson Education, 2002 2.Thomas Erl, ―Service Oriented Architecture: Concepts, Technology, and Design‖, Pearson Education, 2005.

REFERENCES:

1. Frank P.Coyle, –XML, Web Services and the Data Revolution‖, Pearson Education, 2002.
2. Eric Newcomer, Greg Lomow, –Understanding SOA with Web Services‖, Pearson Education, 2005.
3. Sandeep Chatterjee and James Webber, –Developing Enterprise Web Services: An Architect's Guide‖, Prentice Hall, 2004.
4. James McGovern,Sameer Tyagi, Michael E.Stevens, Sunil Mathew, ‖Java Web. Services Architecture‖, Morgan Kaufmann Publishers, 2003.

OUTCOMES:

Upon successful completion of this course,

- students will be able to: x Build applications based on XML.
- Develop web services using technology elements.
- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech IT – II Sem

L	T/P/D	C
3	-/-/-	3

(R18A1211) ADVANCED DATABASES
(Professional Elective 5)

Objectives:

- Learn the modelling and design of databases.
- Acquire knowledge on parallel and distributed databases and its applications.
- Study the usage and applications of Object Oriented database
- Understand the principles of intelligent databases.

UNIT I:

Parallel and Distributed Databases:

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems . **Parallel Databases:** I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems. **Distributed Database Concepts:** Distributed Data Storage – Distributed Transactions –Commit Protocols – Concurrency Control – Distributed Query Processing..

UNIT II:

Object Relational Databases: Concepts for Object Databases: Object Identity –Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence –Type and Class Hierarchies – Inheritance – Complex Objects . **Object Database Standards, Languages and Design:** ODMG Model – ODL – OQL. **Object Relational and Extended – Relational Systems:** Object Relational features in SQL/Oracle.

UNIT III:

Intelligent Databases: Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications Design Principles for Active Rules. **Temporal Databases:** Overview of Temporal DatabasesTSQL2. **Deductive Databases:** Logic of Query Languages – Data log Recursive Rules Syntax and Semantics of Data log Languages- Implementation of Rules and Recursion Recursive Queries in SQL. **Spatial Databases:** Spatial Data Types- Spatial Relationships Spatial Data Structures- Spatial Access Methods- Spatial DB Implementation.

UNIT IV:

Advanced Data Models: Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management -Location Dependent Data Distribution - Mobile Transaction Models. **Concurrency Control**: Transaction Commit Protocols- Multimedia Databases Information Retrieval- Data Warehousing Data Mining- Text Mining.

UNIT V:

Emerging Technologies:

XML Databases: XML-Related Technologies-XML Schema- XML Query Languages-Storing XML in Databases-XML and SQL- Native XML Databases. **Web Databases:** Geographic Information Systems- Biological Data Management. **Cloud Based Databases:** Data Storage Systems on the Cloud. Cloud Storage Architectures-Cloud Data Models- Query Languages. Introduction to Big Data-Storage-Analysis.

Text Books:

1. R. Elmasri, S.B. Navathe, –Fundamentals of Database Systems‖, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, –Database Systems, A Practical Approach to Design,Implementation and Management‖, Third Edition, Pearson Education, 2007.

References:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, –Database SystemConcepts‖, Fifth Edition, McGraw Hill, 2006.

Outcomes:

- Demonstrate the emerging databases such as XML, Cloud and Big Data.
- Estimate the inquisitive attitude towards research topics in databases.
- Apply the knowledge of XML in designing the data bases.
- Develop the databases that are used in cloud and bigdata.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech IT – II Sem **L T/P/DC**

3 -/-/- 3

(R18A0534) BLOCK CHAIN TECHNOLOGY
(Professional Elective 5)

Course Objectives

- To enable the student to understand and appreciate, the importance of fundamentals of blockchain technology and application of cryptography in blockchain.
- To gain the awareness about the concepts of various implementations of blockchain technology such as bitcoin, Ethereum, and Hyperledger

UNIT - I

Introduction to Blockchain Technology – Distributed systems – The history of blockchain – Introduction to blockchain – CAP theorem and blockchain – Benefits and limitations of blockchain – Decentralization using blockchain - Methods of decentralization – Routes to decentralization

UNIT-II

Cryptography in Blockchain: Introduction – cryptographic primitives – Assymetric cryptography – public and private keys -line interface – Bitcoin improvement proposals (BIPs) – Consensus Algorithms.

UNIT – III

BitCoin - Introduction – Transactions – Structure - Transactions types – The structure of a block– The genesis block – The bitcoin network– Wallets and its types– Bitcoin payments– Bitcoin investment and buying and selling bitcoins – Bitcoin installation – Bitcoin programming and the command-line interface – Bitcoin improvement proposals (BIPs).

UNIT-IV

Ethereum - Ethereum block chain- Elements of the Ethereum block chain– Precompiled contracts – Accounts and its types – Block header- Ether – Messages – Mining - Clients and wallets – Trading and investment – The yellow paper - The Ethereum network - Applications developed on Ethereum - Scalability and security issues.

UNIT-V

Smart Contract and Hyper ledger – – History of Smart Contract – Ricardian contracts - The DAO. Hyper ledger projects – Hyperledger as a protocol – Fabric - Hyperledger Fabric - Sawtooth lake – Corda Architecture.

TEXT BOOKS:

1. Bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition, 2nd Revised edition edition. Birmingham: Packt Publishing, 2018.

REFERENCE BOOKS:

1. A. M. Antonopoulos, Mastering bitcoin, First edition. Sebastopol CA: O'Reilly, 2015.
2. Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, ―An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends,‖ in 2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp. 557–564.

Course Outcomes:

- Student will be able to
- To understand the fundamentals of blockchain technology.
- Apply knowledge of implementations of Bitcoin, Ethereum and Hyperledger to develop solutions in the appropriate domains.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech IT – II Sem

L	T/P/D	C
3	-/-/-	3

(R18A1212) MIDDLEWARE TECHNOLOGIES
(Professional Elective 5)

UNIT-I

Introduction to client server computing: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

UNIT-II

CORBA with Java: Review of Java concept like RMI, RMI API, JDBC. Client/Server CORBA- style, The object web: CORBA with Java.

Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object –Oriented Programming with C#; Callback Interfaces, Delegates, and Events.

UNIT III

Building c# applications: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count multi count.

UNIT IV

Existential CORBA : CORBA initialization protocol, CORBa activation services, CORBAIDL mapping CORBA java- to- IDL mapping, The introspective CORBA/Java object.

Java Bean Component Model : Events, properties, persistency, Intrespection of beans, CORBA Beans.

UNIT V

EJBs and CORBA: Object transaction monitors CORBA OTM‘s, EJB and CORBA OTM‘s, EJB container frame work, Session and Entity Beans, The EJB client/server development Process The EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

TEXT BOOKS :

1. Client/Server programming with Java and CORBA Robert Orfali and Dan Harkey, John Wiley & Sons ,SPD 2nd Edition
2. Java programming with CORBA 3rd Edition, G.Brose, A Vogel and K.Duddy, Wiley-dreamtech, India John wiley and sons

REFERENCES :

1. Distributed Computing, Principles and applications, M.L.Liu, Pearson Education
2.Client/Server Survival Guide 3rd edition Robert Orfali Dan Harkey & Jeri Edwards, John Wiley & Sons

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

BACHELOR OF TECHNOLOGY
MECHANICAL ENGINEERING

Course Structure and Syllabus

(Batches admitted from the academic year 2018 - 2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ✓ "Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

- ✓ "Academic Autonomy" means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

- ✓ "Commission" means University Grants Commission.

- ✓ "AICTE" means All India Council for Technical Education.

- ✓ "University" the Jawaharlal Nehru Technological University, Hyderabad.

- ✓ "College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

- ✓ "Program" means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech

- ✓ "Branch" means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.

- ✓ "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

- ✓ T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

Department of Mechanical Engineering

Department Vision:

To become an innovative knowledge center in mechanical engineering through state-of-the-art teaching-learning and research practices, promoting creative thinking professionals.

Articulation of Department Vision Statement:

The science and technological developments have been proliferating the scope of mechanical engineering over i1.0 through i4.0. Innovative practices, Sustainable systems and wide-spread adoption of intelligent systems have been the integral domains in development of product, technology or a service. These technological advances opened numerous research opportunities in Automation, Computational fluid dynamics, Smart manufacturing, Smart-Grids, Transportation, Sustainable energy systems and Environment etc. At this juncture the next generation mechanical engineering professionals should be well trained to provide pragmatic solutions to the dynamic challenges.

The department of Mechanical engineering practices innovative Teaching-Learning methodologies to become an innovative knowledge center in mechanical engineering through state-of-the-art teaching-learning and research practices, promoting creative thinking professionals.

Department Mission:

The Department of Mechanical Engineering is dedicated for transforming the students into highly competent Mechanical engineers to meet the needs of the industry,inachangingandchallengingtechnicalenvironment,bystronglyfocusing in the fundamentals of engineering sciences for achieving excellent results in their professional pursuits.

Articulation of Department Mission Statement:

The Department of Mechanical Engineering mission is on lieu with that of CMR Educational Society and Malla Reddy College of Engineering & Technology. Our Students are provided with a strong theoretical foundation, practical engineering skills, experience in interpersonal communication and teamwork, and a daily emphasis on ethics, professional critical thinking. Our graduates are prepared for successful engagement in commercial and industrial enterprise, research and development, and graduate study. Students are trained to THINK as Engineers. This show cases the mission of the department.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The Programme Educational Objectives of the programme offered by the department are broadly listed below:

PEO1: PREPARATION To provide sound foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems.
PEO2: CORE COMPETANCE To provide thorough knowledge in Mechanical Engineering subjects including theoretical knowledge and practical training for preparing physical models pertaining to Thermodynamics, Hydraulics, Heat and Mass Transfer, Dynamicsof Machinery, Jet Propulsion, Automobile Engineering, Element Analysis,Production Technology, Mechatronics etc.
PEO3: INVENTION, INNOVATION AND CREATIVITY To make the students to design, experiment, analyze, interpret in the core field with the help of other inter disciplinary concepts wherever applicable.
PEO4: CAREER DEVELOPMENT To inculcate the habit of lifelong learning for career development through successful completion of advanced degrees, professional development courses, industrial training etc.
PEO5: PROFESSIONALISM Toimparttechnicalknowledge,ethicalvaluesforprofessionaldevelopmentofthe student to solve complex problems and to work in multi-disciplinaryambience, whose solutions lead to significant societal benefits.

The Program Educational Objectives of the program offered by the department are articulated as follows.

PEO1: PREPARATION To provide sound foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems.	• The basic requirement for any student is to become asuccessful graduate is to have basic knowledge onfundamentals. • Therefore, the first andforemost the objective is defined as Preparation.
PEO2: CORE COMPETANCE To provide thorough knowledge in Mechanical Engineering subjects including theoretical knowledge and practical training for preparing physical models pertaining to core field.	• Providing services as per the Government & Industrial development plans andthrust areas. • Considering reports and projections of CII, ELIAP,AICTE, HRD etc., on industrial developmentsrequirements.
PEO3: INVENTION, INNOVATION AND CREATIVITY To make the students to design,	• Preparing students to solve complex engineeringproblems, which require idea about inventing, innovationand

Program Specific Outcomes (PSOs)

PEO1: PREPARATION To provide sound foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems.	• The basic requirement for any student is to become asuccessful graduate is to have basic knowledge onfundamentals. • Therefore, the first andforemost the objective is defined as Preparation.
PEO2: CORE COMPETANCE To provide thorough knowledge in Mechanical Engineering subjects including theoretical knowledge and practical training for preparing physical models pertaining to core field.	• Providing services as per the Government & Industrial development plans andthrust areas. • Considering reports and projections of CII, ELIAP,AICTE, HRD etc., on industrial developmentsrequirements.
PEO3: INVENTION, INNOVATION AND CREATIVITY To make the students to design,	• Preparing students to solve complex engineeringproblems, which require idea about inventing, innovationand

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and

responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
12. **Life- long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE STRUCTURE

I Year B. Tech – I Semester (Non - Circuit Branches)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0001	English	2	-	-	2	30	70
2	R18A0021	Mathematics – I	4	1	-	4	30	70
3	R18A0013	Engineering Chemistry	3	-	-	3	30	70
4	R18A0261	Basic Electrical and Electronics Engineering	3	-	-	3	30	70
5	R18A0501	Programming for Problem Solving	3	-	-	3	30	70
6	R18A0082	Engineering/IT Workshop	-	-	4	2	30	70
7	R18A0581	Programming for Problem Solving Lab	-	-	3	1.5	30	70
8	R18A0289	Basic Electrical and Electronics Engineering Lab	-	-	3	1.5	30	70
9*	R18A0003	Human Values & Societal Perspectives	2	-	-	-	100	-
TOTAL			**17**	**1**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

I Year B. Tech – II Semester (Non - Circuit Branches)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0002	Professional English	2	-	-	2	30	70
2	R18A0022	Mathematics – II	4	1	-	4	30	70
3	R18A0012	Engineering Physics	3	-	-	3	30	70
4	R18A0502	Object Oriented Programming	3	-	-	3	30	70
5	R18A0301	Engineering Graphics	1	-	4	3	30	70
6	R18A0083	Engineering Physics/Chemistry Lab	-	-	4	2	30	70
7	R18A0582	Object Oriented Programming Lab	-	-	3	1.5	30	70
8	R18A0081	English Language Communication Skills Lab	-	-	3	1.5	30	70
TOTAL			**13**	**1**	**14**	**20**	**240**	**560**

II Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0302	Engineering Mechanics	3	-	-	3	30	70
2	R18A0303	Thermodynamics	3	-	-	3	30	70
3	R18A0304	Fluid Mechanics & Hydraulic Machines	3	1	-	3	30	70
4	R18A0305	Materials Engineering	3	-	-	3	30	70
5	R18A0306	Machine Drawing	3	-	-	3	30	70
6	R18A0307	Kinematics of Machinery	3	-	-	3	30	70
7	R18A0381	Fluid Mechanics & Hydraulic Machinery Lab.	-	-	3	1.5	30	70
8	R18A0382	Materials Engineering Lab.	-	-	3	1.5	30	70
9	R18A0014	Environmental Science	2	-	-	-	100	-
TOTAL			20	1	6	21	340	560

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0308	Applied Thermodynamics	3	-	-	3	30	70
2	R18A0309	Strength of Materials	3	-	-	3	30	70
3	R18A0310	Dynamics of Machinery	3	1	-	3	30	70
4	R18A0311	Manufacturing Processes	3	-	-	3	30	70
5	R18A0024	Probability & Statistics	3	-	-	3	30	70
6	****	OPEN ELECTIVE 1	3	-	-	3	30	70
7	R18A0383	Strength of Materials Lab	-	-	3	1.5	30	70
8	R18A0384	Manufacturing Processes Lab.	-	-	3	1.5	30	70
9	R18A0005	Foreign Language(German)	2	-	-	-	100	-
		TOTAL	20	1	6	21	340	560

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE I		
S.NO	SUBJECT CODE	SUBJECT
1	R18A0351	Intellectual Property Rights
2	R18A0352	Green Energy Systems
3	R18A0553	Data Structures using python
4	R18A0451	Digital Electronics
5	R18A0551	Data Base Systems
6	R18A0555	Data Visualization

III Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0312	Computer Integrated Manufacturing Technologies	3	-	-	3	30	70
2	R18A0061	Managerial Economics & Financial Analysis	3	1	-	3	30	70
3	R18A0313	Internal Combustion Engines	3	-	-	3	30	70
4	R18A0314	Machine Design – I	3	-	-	3	30	70
5	***	**PROFESSIONAL ELECTIVE 1**	3	-	-	3	30	70
	R18A0315	Design of Hydraulic and Pneumatic Systems						
	R18A0316	Innovative Design Thinking						
	R18A0317	Mechanical Vibrations						
6	****	**OPEN ELECTIVE -2**	3	-	-	3	30	70
7	R18A0385	Thermal Engineering and EnergyResourcesLab.	-	-	3	1.5	30	70
8	R18A0386	Manufacturing Technology Lab.	-	-	3	1.5	30	70
9*	R18A0007	Constitution of India	2	-	-	-	100	-
		TOTAL	**20**	**1**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A0353	Enterprise Resource Planning
2	R18A0354	Nano Technology
3	R18A1251	Management Information Systems
4	R18A0552	Introduction to Java Programming
5	R18A1252	Software Project Management

III Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0318	Heat Transfer	3	1	-	3	30	70
2	R18A0319	Computer Aided Design	3	-	-	3	30	70
3	R18A0320	Machine Design –II	3	-	-	3	30	70
4	***	**PROFESSIONAL ELECTIVE 2**	3	-	-	3	30	70
	R18A0321	Smart Manufacturing Technologies						
	R18A0322	Computational Fluid Dynamics						
	R18A0323	Tool Design						
5	****	**OPEN ELECTIVE 3**	3	-	-	3	30	70
6	R18A0387	Computer Aided Design and Manufacturing Lab	-	-	3	1.5	30	70
7	R18A0388	Heat Transfer Lab.	-	-	3	1.5	30	70
8	R18A0394	Mini Project (Summer Internship)	-	-	6	3	30	70
9*	R18A0006	Technical Communication & Soft Skills	2	-	-	-	100	-
TOTAL			**17**	**1**	**12**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R18A0355	Total Quality Management
2	R18A0452	Robotics & Automation
3	R18A0251	Electrical Systems & Applications
4	R18A0453	Internet of Things & Its Applications
5	R18A1253	Software Testing Techniques
6	R18A0554	Operating System Concepts

IV Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0324	Automation and Control Engineering	3	-	-	3	30	70
2	R18A0325	Operations Research	3	1	-	3	30	70
3	R18A0326	Mechanical Measurements and Instrumentation	3	-	-	3	30	70
4	R18A0327	Finite Element Analysis	3	-	-	3	30	70
5	***	**PROFESSIONAL ELECTIVE 3**	3	-	-	3	30	70
	R18A0328	Production and Operations Management						
	R18A0329	Heating Ventilation and Air Conditioning						
	R18A0330	Product Design and Development						
6	R18A0389	Mechanical Measurements and Instrumentation Lab	-	-	3	1.5	30	70
7	R18A0390	Automation and Control Engineering Lab	-	-	3	1.5	30	70
8	R18A0395	Project-I (Project or Summer Internship)	-	-	6	3	30	70
TOTAL			**15**	**1**	**12**	**21**	**240**	**560**

IV Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R18A0331	Automobile Engineering	3	-	-	3	30	70
2	***	**PROFESSIONAL ELECTIVE 4**	3	-	-	3	30	70
	R18A0332	Industrial Engineering and Management						
	R18A0333	Maintenance and Safety Engineering						
	R18A0334	Technology Management						
3	***	**PROFESSIONAL ELECTIVE 5**	3	-	-	3	30	70
	R18A0335	Renewable Energy Sources						
	R18A0336	Biomass Engineering						
	R18A0337	Energy Conservation and Management						
4	R18A0396	Project –II	-	-	12	6	60	140
TOTAL			**9**	-	**12**	**15**	**150**	**350**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM -MECH **L T/P/D /C**
2 - / - / - / 2

(R18A0001)ENGLISH

INTRODUCTION:

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected act as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

Course OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing to ensure error-free writing.
4. To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.
5. To expose students to various techniques of reading skills which hone their comprehensive skills.

SYLLABUS:

Unit –I

Chapter entitled "***The Road Not Taken****" by* Robert Frost (8 hrs)
Grammar –Tenses and Punctuation(Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing – Paragraph writing –I (Focusing on Tenses and Punctuations)
Reading – Techniques for effective reading-Reading Exercise –Type 1

Unit – II

Chapter entitled "***Abraham Lincoln's Letter to His Son's Teacher***" (7 hrs)
Grammar – Voices, Transitive and Intransitive Verbs
Vocabulary – Synonyms, Antonyms
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Skimming, scanning- Reading Exercise –Type 2

Unit – III

Chapter entitled "***War***" by L. Pirandello (6 hrs)
Grammar –Degrees of Comparison, Prepositions
Vocabulary – Phrasal Verbs
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Comprehension- Reading Exercise – Type 3

Unit – IV
Chapter entitled "***J K Rowling's Harvard Speech***" (6 hrs)
Grammar – Articles, Misplaced Modifiers
Vocabulary – One-Word Substitutes
Writing – Précis Writing
Reading – Intensive and Extensive reading - Reading Exercise – Type 4

Unit –V
Sentence Structures (phrases and clauses) (7 hrs)
Grammar –Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading – Identifying Errors - Reading Exercise – Type 5

* Exercises apart from the text book shall also be used for classroom tasks.

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course OUTCOMES:

Students will be able to:

1. write formal or informal letters and applications for different purposes.
2. select and extract relevant information through skimming and scanning.
3. utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
4. draft concise emails following professional email etiquette.
5. enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM –MECH

L	T/P/D	C
4	1/-/-	4

(R18A0021) MATHEMATICS -I

Course Objectives:

1. The concept of rank of a matrix which is used to know the consistency of system of linear equations and to find the eigen vectors of a given matrix.
2. Finding maxima and minima of functions of several variables.
3. Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)
4. How to solve first order linear, nonlinear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.
5. Solving differential equations using Laplace Transforms.

UNIT I: Matrices

Introduction, types of matrices-symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal, unitary matrices. Rank of a matrix - echelon form, normal form, consistency of system of linear equations (Homogeneous and Non-Homogeneous). Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation.

UNIT II:Functions of Several Variables

Limit continuity, partial derivatives and total derivative. Jacobian-Functional dependence and independence. Maxima and minima and saddle points, method of Lagrange multipliers, Taylor's theorem for two variables.

UNIT III:Ordinary Differential Equations

First order ordinary differential equations: Exact, equations reducible to exact form. Applications of first order differential equations - Newton's law of cooling, law of natural growth and decay.

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V. Method of variation of parameters.

UNIT IV: Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional (Heat equation).

UNIT V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by “t”, Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by ”s”, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.

ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

iii) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

REFERENCE BOOKS:

i)Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.

ii)Advanced Engineering Mathematics by Michael Green Berg, Pearson Publishers .

iii)Engineering Mathematics by N.P Bali and Manish Goyal.

Course Outcomes: After learning the concepts of this paper the student will be able to

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first and higher order differential equations.
4. Solve first order linear and non-linear partial differential equations.
5. Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH – I YEAR – I SEM - MECH **L T/P/D C**

3 -/-/- 3

(R18A0013) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
2. To analyze microscopic chemistry in terms of atomic and molecular orbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
5. To analyze different types of fuels and their applications in various engineering fields.

Unit-I: Electrochemistry and Corrosion (12 lectures)

Electrochemistry: Introduction to electrochemistry; Electrochemical cells - electrode potentials, construction and working of a galvanic cell, EMF and its applications - potentiometric titration; Nernst equation and its applications; Batteries - classification of batteries, primary cell - lithium cells and secondary cells - lead acid battery and lithium ion battery; Fuel cells - H_2-O_2 fuel cell, its applications and advantages.

Corrosion: Introduction, causes and effects of corrosion; Theories of corrosion- chemical (oxidation corrosion) and electrochemical corrosion, mechanism of electrochemical corrosion; Corrosion control methods - cathodic protection - sacrificial anodic protection & impressed current cathodic protection; Methods of application of metallic coatings - hotdipping - galvanizing & tinning, electroplating (Cu plating) and electroless plating (Ni plating) - advantages and applications of electroplating/electroless plating.

Unit -II: Atomic and Molecular Structure (8 lectures)

Atomic and molecular orbitals; Postulates of molecular orbital theory - Linear Combination of Atomic Orbitals (LCAO); Molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2 and O_2; Metallic bonding, limitations of Valence Bond Theory (VBT).

Crystal field theory (CFT) – Salient features of CFT, crystal field splitting of transition metal ion d-orbitals in tetrahedral and octahedral geometries.

Unit -III: Water and its Treatment (**6 lectures**)

Hardness of water- Types and units of hardness; Estimation of hardness of water by EDTA method; Softening of water by Ion exchange process; Potable water- specifications, methods of disinfectation-chlorination and ozonization; Desalination of water by Reverse Osmosis.

Unit-IV: Organic Reactions (10 lectures)

Introduction to Organic Reactions - Types of reactions; Substitution - Nucleophilic substitution reactions, mechanism of S_N1 and S_N2; Addition - electrophilic and nucleophilic

addition reactions; addition of HBr to propene - Markownikoff and Anti-Markownikoff's additions; Elimination reactions - dehydrohalogenation of alkyl halides; Oxidation reactions - oxidation of alcohols using $KMnO_4$ and chromic acid; Reduction reactions - reduction of carbonyl compounds using $LiAlH_4$ and $NaBH_4$.

Unit-V: Energy Sources (8 lectures)

Fuels- Definition, classification (solid, liquid & gaseous fuels) - characteristics of a good fuel; Coal - analysis of coal-proximate and ultimate analysis and their significance; Petroleum - refining, knocking - octane and cetane number, cracking - fluid bed catalytic cracking; Natural gas, LPG, CNG - constituents, characteristics and uses.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpat Rai Publishing Company (P) Ltd, 16thEdition, New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, SubhenduChakroborty, Cengage Learning Publication, India Private Limited , 2018.

Reference Books:

1. University Chemistry by B. H. Mahan, Pearson, IV Edition.
2. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
3. Reactions, Rearrangements and Reagents by S.N. Sanyal, Bharati Bhavan Publishers.

COURSE OUTCOMES: The basic concepts included in this course will help the student to:

1. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
2. Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
3. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
4. Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
5. Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH – I YEAR – I SEM - MECH **L T/P/D C**
3 -/-/- 3

(R18A0261) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course OBJECTIVES:

1. To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.
2. To analyze microscopic chemistry in terms of atomic and molecular orbitals.
3. To analyze water for its various parameters and its significance in industrial and domestic applications.
4. To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
5. To analyze different types of fuels and their applications in various engineering fields.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws. (Simple Problems).

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks and meshanalysis

Network Theorems: Thevenin's Theorem, Norton's Theorem and Superposition Theorem.

UNIT-III:

Electrical Machines (elementary treatment only):

DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

Single phase transformer: principle of operation, constructional features and emf equation.

UNIT –IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode applications, Zener Diode: characteristics , Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

UNIT –V:

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations. (elementary treatment only)

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University.
2. Basic Electrical and electronics Engineering-D P Kothari. I J NagarathMcGraw Hill Education.

3. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998. 3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
3. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2 nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
4. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
5. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

Course OUTCOMES: After this course, the student will be able

1. To analyze and solve electrical circuits using network laws and theorems.
2. To identify and characterize diodes and various types of transistors.
3. Design and analyse the DC bias circuitry of BJT
4. Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers.
5. Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- MECH

L	T/P/D	C
3	-/-/-	3

(R18A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs
4. To learn to write programs (using structured programming approach) in C tosolve problems.
5. To Learn the solving and logical skills to programming in C language and also in other languages.

UNIT - I

Introduction to Computing – Computer Systems-Hardware and Software, Computer Languages, Algorithm, Flowchart, Representation of Algorithm and Flowchart with examples.

Introduction to C– History of C, Features of C, Structure of C Program, Character Set, C Tokens-Keywords, Identifiers, Constants, Variables, Data types, Operators.

UNIT-II

Statements-Selection statements (Decision Making)- if and switch statements with examples, Repetition statements (loops)- while, for, do-while statements with examples, Unconditional statements- break, continue, goto statements with examples.

UNIT – III

Functions-Designing Structured Programs, Types of Functions-User defined functions, Standard functions, Categories of functions, Parameter Passing techniques, Storage classes, Recursion.

UNIT-IV

Arrays- Declaration and Initialization, One dimensional Arrays, Two dimensional Arrays.

Strings- Declaration and Initialization, String Input / Output functions, String manipulation functions.

UNIT-V

Pointers- Introduction, Definition and Declaration of pointers, address operator, Pointer variables, Pointers with Arrays.

Structures- Introduction, Declaration and Initialization, Array of Structures, Unions.

TEXT BOOKS:

1. Computer Programming with C, Special Edition-MRCET, Mc Graw Hill Publishers 2017.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg. Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Let us C ,YashwanthKanethkar, 13th Edition, BPB Publications.

COURSE OUTCOMES:

1. Demonstrate the basic knowledge of computer hardware and software.
2. To formulate simple algorithms for arithmetic and logical problems.
3. To translate the algorithms to programs (in C language).
4. To test and execute the programs and correct syntax and logical errors.
5. Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – I- YEAR –I SEM- MECH **L T/P/D C**

- -/-/ 4 2

(R18A0082)ENGINEERING WORKSHOP/IT WORKSHOP

COURSEOBJECTIVES:

1. Student able to learn about different tools used in the lab
2. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations
3. Student able to learn about different Carpentry and Fitting tools.
4. Student able to learn about different tools used in the lab.
5. Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Welding
4. Foundry

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
   Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

COURSE OUTCOMES:

1. Apply knowledge for computer assembling and software installation that meets the specified needs of office considerations.
2. Ability to solve the trouble shooting problems in designing IT tools or any other component related to soft ware.
3. Apply the tools for preparation of PPT, Documentation and budget sheet etc. so that the students cope with any kind of complex activities in their engineering work set up.
4. Students can understand different machine shop operations
5. Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operation and learned about metal cutting processes.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I YEAR- I SEM-MECH **L T/P/D C**

-/ 4 /- 2

(R18A0082)IT WORKSHOP LAB

Course OBJECTIVES:

1. The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point
2. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition hardware and software level troubleshooting process, tips and tricks would be covered.
3. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.
4. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools.
5. HTML introduction for creating static web pages

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOS Commands

Week 4:Hardware Troubleshooting

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given amalfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 6: MICROSOFT WORD

Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 7: MICROSOFT EXCEL

Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting .

Week 8: MICROSOFT POWER POINT

Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Create the presentation using the following tools:

Formatting: Color, font type, font size, font style etc.

Header and Footer

Bullets and Numbering

Drawing Toolbar: Auto shapes, Textboxes, etc

Design Template

Introduction to custom animation.

b)Create a presentation to conduct a creativity session using the following tools:

1. Slide transition
2. Master slide view
3. Insert picture – clipart, image
4. Action button
5. Drawing tool bar – lines, arrows
6. Hyperlink
7. Custom animation
8. Hide slide
9. Wash out

Week 9: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation of website

Designing a static web page: Understand how to create a webpage

Course OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The Students develop ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.
5. The students are able to create a static webpage's using HTML.

Text Books:

1. Introduction to Information Technology,ITL Education Solutions limited,Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I YEAR- I SEM-MECH

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(R18A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

Course OBJECTIVES:

1. Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.
6. Programming using gcc compiler in Linux.

Week 1:

a) Write a C program to find sum and average of three numbers.

b) Write a C program to find the sum of individual digits of a given positive integer.

Week 2:

a) Write a C program to generate the first n terms of the Fibonacci sequence.

b) Write a C program to generate prime numbers from 1 to n.

c) Write a C program to check whether given number is Armstrong Number or not.

Week 3:

a) Write a C program to check whether given number is perfect number or not.

b) Write a C program to check whether given number is strong number or not.

Week 4:

a) Write a C program to find the roots of a quadratic equation.

b) Write a C program to performarithmeticoperationsusing switch statement.

Week 5:

a) Write a C program to find factorial of a given integer using non-recursive function.

b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

a) Write C program to find GCD of two integers by using recursive function.

b) Write C program to find GCD of two integers using non-recursive function.

Week 7:

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C program to Sort the Array in an Ascending Order

c) Write a C program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

a) Write a C program to perform addition of two matrices.

b) Write a C program that uses functions to perform multiplication of two Matrices.

Week 10:

a) Write a C program to use function to insert a sub-string in to given main string from a given position.

b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

a) Write a C program using user defined functions to determine whether the given string is palindrome or not.

b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

Week 12:

a) Write C program to count the number of lines, words and characters in a given text.

b) Write a C program to find the sum of integer array elements using pointers.

Week 13:

a) Write a C program to Calculate Total and Percentage marks of a student using structure.

Week 14:

Revision of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V.RAjaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.NVenkateswarlu and E.V.Prasad,S.Chand Publishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMH Publishers.

Course OUTCOMES:

1. Acquire knowledge about the basic concept of writing a program.
2. Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3. Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
4. Understand the Role of Functions involving the idea of modularity.
5. Understand the Concept of Array and pointers dealing with memory management.
6. Learn Structures and unions through which derived data types can be formed.

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(R18A0289) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course OBJECTIVES:

1. To Design Electrical Systems.
2. To Analyze A Given Network By Applying Various Network Theorems.
3. To Expose The Students To The Operation Of DC Generator.
4. To Expose The Students To The Operation Of DC Motor and Transformer.
5. To get the knowledge using electrical measuring devices.

CYCLE – 1

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Superposition theorem.
5. Swinburne's test on DC shunt machine.
6. OC & SC tests on single phase transformer.

CYCLE – 2

1. PN Junction diode characteristics.
2. Zener diode characteristics.
3. Half wave rectifier with and without filter.
4. Full wave rectifier with and without filter.
5. Transistor CB Characteristics (Input And Output)
6. Transistor CE Characteristics (Input And Output)

NOTE: Any 10 of Above Experiments Are To Be Conducted

Course OUTCOMES:

After successfully studying this course, students will:

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines.
3. Acknowledge the principles of operation and the main features of electric machines and their applications.
4. Acquire skills in using electrical measuring devices.
5. Acquire skills in using electrical measuring devices.

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(R18A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVES
(Mandatory Course)

INTRODUCTION:

Human values are the virtues that guide us to take into account human element when one interacts with other human beings. It's both what we expect others to do for us and what we aim to give to other human beings. These human values give the effect of bonding, comforting and reassuring.

Course OBJECTIVES:

This introductory course input is intended:

1. to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. to facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. to highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.
4. To learn trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature
5. To facilitate Such a holistic perspective forms the basis of value based living in a natural way.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha) - from family to world family!

UNIT - IV:

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ekParichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan& V. S Senthil kumar, Engineering Ethics (includingHumna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

Course OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at all levels.
3. They can have satisfying human behavior throughout their life.
4. They will learn trustful and mutually satisfying human behavior.
5. Students will be able to know holistic perspective forms the basis of value based living in a natural way.

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(R18A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

Course OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

SYLLABUS:

UNIT-I (7 hrs)
Listening - Bill Gate's TED talk on Solving Big Problems
Speaking - Description of Pictures, Places, Objects and Persons
Grammar - Finite and Non-finite verbs
Vocabulary - Business Vocabulary
Writing - Paragraph Writing

Unit –II (8 hrs)
Listening - Google CEO Sundar Pichai's Speech I/O 2017 Keynote
Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

Unit –III (8 hrs)
Listening - Sample Interviews (videos)
Speaking - Mock Interviews
Grammar - Direct and Indirect Speech
Vocabulary - Standard Abbreviations (Mini Project)
Writing - Job applications I (Cover Letter)

Unit – IV (6 hrs)
Listening - Telephonic Interviews

Speaking - Telephonic Expressions
Grammar - Auxiliary verbs
Vocabulary - Word Analogy-I
Writing - Job Application II (Resume)

Unit – V (5 hrs)

Listening - Tanmay Bhakshi's ITU interview
Speaking - Professional Etiquette
Grammar - Common Errors
Vocabulary - Word Analogy-II
Writing - Report Writing

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERNCE BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course OUTCOMES:

Students will be able to:

1. draft coherent and unified paragraphs with adequate supporting details.
2. demonstrate problem solving skills, decision-making skills, analytical skills.
3. comprehend and apply the pre-interview preparation techniques for successful interview.
4. achieve expertise in writing resume and cover letter formats.
5. understand the steps of writing 'Reports and Abstract'.

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(R18A0022)MATHEMATICS-II

Course OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.
2. To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.
3. Evaluation of improper integrals using Beta and Gamma functions.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT – I: Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton Raphson method and their graphical interpretations.
Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, backward differences, central differences. Newton's formulae for interpolation, Gauss's central difference formulae. Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II: Numerical Methods

Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.
Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.
Curve fitting: Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

Unit III: Beta and Gamma functions

Introduction of improper integrals-Beta and Gamma functions - Relation between them, their properties, Evaluation of improper integrals using Beta and Gamma functions.

Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V: Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - Work done, Surface integrals, Volume integral. Vector integral theoerem-Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii) Mathematical Methods by S.R.KIyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

i) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.

ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.

iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

Course Outcomes: After learning the contents of this paper the student must be able to

1. Find the roots of algebraic, non algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
2. Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3. Find a numerical solution for a given differential equation.
4. Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions..
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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(R18A0012) ENGINEERING PHYSICS

COURSE OBJECTIVES:

1. To understand the basic concepts of oscillations exhibited by various systems in nature.
2. To understand the basic concepts of light through interference and diffraction.
3. To understand band structure of the solids and classification of materials.
4. To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
5. To be able to distinguish ordinary light with a laser light and their applications in different fields.

UNIT – I

HARMONIC OSCILLATIONS (7Hours)

Mechanical and electrical simple harmonic oscillators, complex number notation and phasor representation of simple harmonic motion, damped harmonic oscillator: over, critical and lightly-damped oscillators; Energy decay in damped harmonic oscillator, Quality factor, forced damped harmonic oscillator.

UNIT – II

WAVEOPTICS (10Hours)

Huygen's principle, Interference: Superposition of waves, interference of light by division of wave front and amplitude, Newton's rings, Michelson interferometer, Diffraction: difference between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, Diffraction grating: Grating spectrum and resolving power.

UNIT- III

INTRODUCTION TO SOLIDS (7 Hours)

Free electron theory, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny modal , E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semi conductors and insulators.

UNIT – IV

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS (10 Hours)

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, Internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

UNIT-V

LASERS (6Hours)

Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Einstein's Coefficients, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers.

TEXT BOOKS:

1. Engineering Physics by Arumugam, Anuradha publications.

2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L.Gupta, Dhanpat Rai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K.Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

COURSE OUTCOMES: After completion of studying Engineering Physics the student is able to,

1. Analyze the various oscillations made by different oscillating bodies in nature.
2. Learn to design a device to go to maximum accuracy in measuring the dimensions optically.
3. Get the knowledge of classification of materials which is used for various applications in material technology.
4. Learn dielectric, magnetic properties of the materials and apply them in material technology.
5. Learn the principles, production of LASER beam and application of LASER in various fields.

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(R18A0502)OBJECT ORIENTED PROGRAMMING

OBJECTIVES:

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming and procedural programming.
- To design applications using object oriented features.
- To teach the student to implement object oriented concepts.

Unit - I

Introduction to Object Oriented Programming: Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures &Loops.

Functions: Introduction to functions, Inline functions, Command Line arguments.

Unit - II

Classes and Objects:

Introduction of Classes: Class Definition, Defining a Members, Objects, Access Control, Class Scope, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Friend Functions.

Constructors and Destructors:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Destructors.

Unit - III

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Pointers: Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes.

Unit - IV

Virtual Functions and Polymorphism:

Polymorphism, Compile time polymorphism: Overloading- Function Overloading, Operator overloading, Run time polymorphism, Virtual Functions.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism.

Unit -V

Templates:

Introduction to Templates, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Standard Template Library Classes: STL Container classes-Array class, Vector,stack,queue, STL Algorithm classes- Sort, reverse, max, min.

Application Development using C++

Text Books:

1. Object Oriented Programming with C++ by Balaguruswamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt,TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.

The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

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(R18A0301)ENGINEERING GRAPHICS

Course Objectives:

1. To enable the students with various concepts like Dimensioning, Conventions and standards related to working drawing in order to become professionally efficient and to introduce fundamental concepts of curves used in engineering,
2. Students are capable to understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so that they can apply these skills in developing the new products.
3. Understands and becomes efficient in applying the concept of Orthographic Projections of Points, Lines and Planes in industrial applications
4. Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
5. Analyze a drawing and can efficiently communicate ideas graphically.

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various DrawingInstruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

a) Polygons – Construction of regular polygons (General Method only)
b) Conic Sections (General Method only- Eccentricity Method)
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines– Parallel and inclined to both planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids.

UNIT – V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views.

Conversion oforthographic views to isometric views – simple objects

Basic Principles of ACAD – Demo Only.

TEXT BOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
2. Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal&V.Prabu Raja New Age Publications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.

Course Outcomes:

1. Get knowledge on usage of various drawing instruments and capable to draw various curves like conic curves, cycloidal curves and involutes.
2. Understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so that they can apply these skills in developing the new products.
3. Understand about orthographic projection and able to draw planes and solids according to orthographic projections.
4. Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
5. To convert and draw the given orthographic view to isometric view and vice versa.

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(R18A0082) ENGINEERING CHEMISTRY LAB
(Any Eight Experiment Compulsory)

COURSE OBJECTIVES:

This course on chemistry lab is designed with 10 experiments in an academic year. It is common to all branches of Engineering in 1st B.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

1. Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
2. Practical implementation of fundamental concepts.
3. The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.
4. Prepare synthetic drug molecule.
5. Determine the strength of an acid by conductometric and potentiometric methods.
6. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

List of Experiments

Titrimetry:
1. Estimation of hardness of water by EDTA method.

Instrumental Methods:
Colorimetry:
2. Determination of Ferrous iron in cement by Colorimetric method
3. Estimation of Copper by Colorimetric method.

Conductometry:
4. Estimation of HCl by Conductometric titrations.
5. Estimation of Acetic acid in a mixture of HCl and Acetic acid by Conductometric titrations.

Potentiometry:
6. Estimation of HCl by Potentiometric titrations.
7. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$.

Preparation:
8. Preparation of Aspirin.

Physical properties:

9. Determination of Viscosity of sample oil by Redwood Viscometer.
10. Determination of Surface Tension of a given liquid by Stalagmometer.

Text Book:

1. Inorganic quantitative analysis, Vogel
2. A text book on experiments and calculation in Engineering Chemistry by S.S. Dara

Suggested Readings:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Text Book of Engineering Chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.

COURSE OUTCOMES: At the end of the course students will be able to

1. Estimate the total hardness present in a sample of water.
2. Select lubricants for various purposes and determine the surface tension of a given liquid.
3. Prepare synthetic drug molecule.
4. Determine the strength of an acid by conductometric and potentiometric methods.
5. Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

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(R18A0582)OBJECT ORIENTED PROGRAMMING LAB

COURSE OBJECTIVES:

1. To strengthen problem solving ability by using the characteristics of an object-oriented approach.
2. To design applications using object oriented features
3. To handle Exceptions in programs.
4. To teach the student to implement object oriented concepts.
5. To strengthen problem solving ability by using the characteristics of an object-oriented approach

Week 1:

Basic C++ Programs

Week2:

a) Write a C++ program to find the sum of individual digits of a positive integer.

b) Write a C++ program to generate the first n terms of the sequence.

Week 3:

a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

b) Write a C++ program to find both the largest and smallest number in a list of integers.

Week 4:

a) Write a C++ program to sort a list of numbers in ascending order.

b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation

Week 5

a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.

b) Program to illustrate default constructor, parameterized constructor and copy constructors

c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data members	
Sname	Name of the student
Marks array	Marks of the student

Total	Total marks obtained
Tmax	Total maximum marks
Member functions	
Member	Description
ssign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data.

Week 6:

a) Write a Program to Demonstrate the i)OperatorOverloading.ii) Function Overloading.

b) Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.

b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

a) Reading a matrix. b) Addition of matrices. c) Printing a matrix.

d) Subtraction of matrices. e) Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

a) Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchical inheritance

Week 11

a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

a) Write a Template Based Program to Sort the Given List of Elements.

b) Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

a) Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
b) Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

Text Books:

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.

COURSE OUTCOMES:

1. Learn problem solving ability by using the characteristics of an object-oriented approach.
2. Explain the applications using object oriented features.
3. Explain the handling exception handlings
4. Able to the student to implement object oriented concepts.
5. To teach problem solving ability by using the characteristics of an object-oriented approach

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B.TECH- I YEAR – II- SEM - MECH

L	T/P/D	C
-	-/3/-	1.5

(R18A0081)ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on phonetic knowledge of the English language and its use in everyday situations and contexts.

COURSE OBJECTIVES:

1. To expose students to a variety of self-instructional, learner-friendly modes of language learning
2. To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.
3. To enable students to overcome public speaking anxiety and equip them to become employable.
4. To familiarize students with formal telephonic expressions by means of appropriate tone.
5. To foster sentence-level and holistic understanding of the context through active listening.

Syllabus: English Language Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions

ICS Lab: Ice-Breaking Activity - JAM Session- Greetings –Taking Leave – Introducing Oneself and Others.

UNIT –II

CALL Lab: Syllabification - Stress &Intonation- Rules of Stress Markings and Intonation

ICS Lab: Situational Dialogues/Role Plays - MakingRequests and Seeking Permissions.

UNIT –III

CALL Lab: Listening Activities (Its Importance – Purpose- Process- Listening for General and Specific Details.)

ICS Lab: Communication at Work Place - Professional Etiquettes, Telephone Etiquette.

ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

The Computer aided Language Lab for 60 students with 60 systems, one master

console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IV Processor
   a) Speed –2.8 GHZ
   b) RAM –512 MB Minimum
   c) HardDisk –80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

A spacious room with movable chairs and audio-visual aids with a public address system, a T. V, a digital stereo –audio & video system and camcorder etc.

DISTRIBUTION AND WEIGHTAGE OF MARKS

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

COURSE OUTCOMES:

Students will be able to:

1. understand the importance of learning phonetics.
2. learn how to pronounce words using phonetic transcription.
3. know the importance of speaking English with rhythm and intonation.
4. effectively participate in JAM session.
5. use polite expressions in all formal situations.
6. effectively communicate through telephone.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B.Tech MECH-I SEM **L T/P/D C**

3 **-/-/- 3**

(R18A0302) ENGINEERING MECHANICS

Course Objectives:

1. Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.
2. Perform analysis of bodies lying on rough surfaces. Explain the concept of analysis of trusses using method of joints and method of sections.
3. Locate the centroid of a body and computethe area moment of inertia and mass moment of inertia of standard and composite sections.
4. Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.

Unit – I

Introduction: Resultants of Force System Parallelogram law **–**Forces and components-Resultant of coplanar Concurrent Forces Moment of Force-problems.

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems

Unit – II

FRICTION: Introduction **–** Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions

Analysis of Pin-Jointed Plane Frames: Determination of Forces in members of plane, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever &simply–supported trusses-by method of joints, method of sections

Unit – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (frombasicprinciples) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Unit – IV

Moments of Inertia: Definition – Polar Moment of Inertia –Radius of gyration - Transfer formula for moment ofinertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - massmoment of inertia of composite bodies.

Unit – V

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion.

Kinetics of particles: D'AlembertsPrincile for plane motion and Connected bodies

TEXT BOOKS:

1. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Company.
2. Engineering Mechanics - Statics and Dynamics by Vijaya Kumar Reddy K , Suresh Kumar J.BS Publications

REFERENCES:

1. Engineering Mechanics / S.S. Bhavikati& K.G. Rajasekharappa
2. A text of Engineering Mechanics / YVD Rao / K. GovindaRajulu/ M. Manzoor Hussain, Academic Publishing Company
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engineering Mechanics / KL Kumar / Tata McGraw Hill.
6. Engineering Mechanics / Irving Shames / Prentice Hall

Course Outcomes:

1. Gain the knowledge on the concepts of force, moment and its application.
2. Understand and apply the knowledge on drawing free body diagrams and solve the problems using analytical methods and law of triangle of forces.
3. Students are capable of finding centroid, center of gravity, moment of inertia and polar moment of inertia including transfer methods and their applications.
4. Understanding the motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion
5. Understand and apply the knowledge on concepts of D'Alembert's principle and particle motion

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	L	T/P/D	C
II Year B.Tech MECH-I SEM	**3**	**0**	**3**

(R18A0303) THERMODYNAMICS

Course Objectives:

1. To understand the concepts of energy transformation, conversion of heat into work.
2. To understand why and how natural processes occur only in one direction unaided.
3. To apply the concepts of thermodynamics to basic energy systems.
4. To understand how the change of state results in a process.
5. Why air standard cycles are important.

UNIT-I

Basic Concepts : System - Types of Systems - Control Volume - Macroscopic and Microscopic viewpoints - Thermodynamic Equilibrium- State, Property, Process, Cycle – Reversibility – Quasi static Process, Irreversible Process, Causes of Irreversibility – Work and Heat, Point and Path functions. Zeroth Law of Thermodynamics – Principles of Thermometry –Constant Volume gas Thermometer – Scales of Temperature – PMM I - Joule's Experiment – First law of Thermodynamics – Corollaries – First law applied to a Process– Steady Flow Energy Equation.

UNIT-II

Limitations of the First Law - Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics.

UNIT-III

Pure Substances: p-V-T- surfaces, T-S and h-s diagrams, Phase Transformations – Triple point at critical state properties during change of phase, Dryness Fraction – Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry. Perfect Gas Laws – Equation of State, specific and Universal Gas constants – Various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy – Throttling and Free Expansion Processes – Flow processes – Deviations from perfect Gas Model – Vander Waals Equation of State.

UNIT-IV

Mixtures of perfect Gases : Mole Fraction, Mass friction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas constant, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases, Vapour, and Atmospheric air - Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature,

Thermodynamic Wet Bulb Temperature, Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation – Psychrometric chart.

UNI-V

Power Cycles : Otto cycle, Diesel cycle, Dual Combustion cycle and Brayton cycle description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – Comparison of Cycles. Basic Rankine cycle – Performance Evaluation.

TEXT BOOKS:

1. Engineering Thermodynamics, Special Edition. MRCET, McGrahill Publishers.
2. Engineering Thermodynamics / PK Nag /TMH, III Edition
3. Thermodynamics – J.P.Holman / McGrawHill

REFERENCE BOOKS:

1. Engineering Thermodynamics – Jones & Dugan
2. Thermodynamics – An Engineering Approach – YunusCengel& Boles /TMH
3. An introduction to Thermodynamics / YVC Rao / New Age
4. Engineering Thermodynamics – K. Ramakrishna / Anuradha Publisher

Course Outcomes:

1. To differentiate between quality and quantity of energy, heat and work, enthalpy and entropy, etc.
2. Quantify the irreversibilites associated with each possibility and choose an optimal cycle.
3. Able to analyze Mollier chart, Gas tables in order to estimate thermodynamic properties such as WBT, DBT, RH etc.
4. Able to utilize psychrometric chart and estimate the various psychrometric properties.
5. Assess which cycle to use for a given application and source of heat.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

L	P	C
3	1	3

(R18A0304) FLUID MECHANICS & HYDRAULIC MACHINES

Course Objectives:

1. To give insight knowledge on fluid statics and kinematics.
2. To gain knowledge on fluid dynamics.
3. To give basic understanding of Hydro Electric power plant and importance of impact of jets.
4. To become familiar about different types of turbines and able to analyze the performance characteristics of various turbines.
5. To be able to understand the working of power absorbing devices like pumps and able to analyze their performance characteristics.

UNIT-I

Fluid Statics: Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT-II

Fluid Kinematics : Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow.

Fluid Dynamics: Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT-III

Boundary Layer Concept: Definition, thickness, characteristics along thin plate, laminar and turbulent boundary layers (No derivation).

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Major and Minor losses - pipes in series and pipes in parallel- total energy line-hydraulic gradient line. Measurement of flow: pitot tube, venturimeter, and orifice meter.

UNIT-IV

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes.

Hydraulic Turbines: Classification of turbines, impulse and reaction turbines,

Pelton wheel turbine, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies. Hydraulic design- draft tube theory- functions and efficiency.

Performance of hydraulic turbines: Geometric similarity, Unit and specific quantities, characteristic curves, cavitation, surge tank, water hammer.

UNIT-V

Centrifugal Pumps: Classification, working, work done – manomertic head and efficiencies specific speed- performance characteristic curves, NPSH.

Reciprocating Pumps: Working, Discharge, slip, indicator diagrams.

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.
3. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria& Sons.
2. Hydraulic Machines by Banga& Sharma, Khanna Publishers.
3. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley , Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).

Course Outcomes:

1. Gain the knowledge on fluid mechanics fundamentals like fluid statics and fluid kinematics
2. Have basic idea about the fundamental equations used in Fluid Dynamics and are able to apply these concepts in real working environment
3. Study the fundamentals of turbo machinery and elements of hydroelectric power plant.
4. Measure the performance of the different types of Hydraulic Turbines
5. Calculate the performance of the different types of Hydraulic Pumps**.**

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II Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0305) MATERIALS ENGINEERING

Course Objectives:

Understand various mechanical properties of materials.

1. To understand how and why the properties of materials are controlled by its structure at the microscopic and macroscopic levels.
2. To understand how and why the structure and composition of a material may be controlled by processing.
3. To create different types of composite materials and its applications.
4. To remember polymer material classifications and applications.

UNIT-I

Structure of Materials: Structure of atom – Atomic models – Bonding in solids – Bonding forces and energies – Ionic, Covalent, metallic and van der Waals Bond - Crystal structure - Unit Cell – Bravais lattice – BCC – FCC – HCP - Interstitial sites – NaCl crystal – CsCl crystal – Perovskite structure – Diamond structure – Graphite – Crystal directions and planes.

UNIT-II

Structure of Metals and Alloys - Imperfection in crystals – Point defects – Dislocations – Slip plane – Movement of dislocations – Planar defects and grain boundaries – solid solutions – Hume Rothery rule – Phase diagram – Lever rule – Gibb's phase rule – Phase diagram for binary alloys – Eutectic – Peritectic – Eutectoid – Zone refining, Solidification of pure metals and alloys, Short and long freeze range alloys, basic concepts of powder metallurgy.

UNIT-III

Ferrous and Non Ferrous Alloys: Allotropy and phase change of pure iron – Classification of steels and cast iron – iron – carbon equilibrium diagram – Microstructure of iron and steel - Ferrous alloys and their applications, High Resistivity alloys – nichrome, manganin, constantan and kanthal and their composition and applications – Super hard materials - Tungsten carbide and Boron nitrides.

Heat Treatment Methods: Annealing, hardening, tempering, normalizing, surface hardening

UNIT-IV

Ceramic Materials:Introduction to Ceramics, Advanced Ceramic Materials - Crystal Structures –Silicate ceramics, glass and its manufacturing process, Functional properties and applications of ceramic materials.

Composites Materials: Introduction,Classification of composites - Fiber reinforced materials – Law of mixtures – Continuous fibers – discontinuous fibers – Particle-reinforced materials – Cermets – Dispersion strengthened materials – Laminates - Application of composites in electrical and mechanical components – nuclear industry.

UNIT-V

Polymer Materials: Polymers,Classification of polymer – Mechanisms of polymerization - Some commercially important individual polymer – Thermoplastics - Elastomers –

Thermosets – Engineering plastics - Liquid crystal polymers - Conductive polymers – High

Performance fibers - Biomedical applications – Photonic polymers.

TEXT BOOKS:

1. Material Science by Dr. Kodgire, Everest publications,Pune.
2. V.Raghavan, Material Science and Engineering, Prentice –Hall of India Pvt. Ltd., 2007
3. Sidney H. Avner, Introduction to physical metallurgy, Tata Mc-Graw-Hill, Inc. 1997.

REFERENCE BOOKS:

1. Donald R. Askeland, Pradeep P. Phule, The Science and Engineering of Materials 4thEdition,Thomson/Brooks/Cole,2003.
2. William F.Smith, Structural Properties of Engineering Alloys, Tata Mc-Graw-Hill, Inc., 1993.
3. Kingery. W.D., Bowen H.K. and Uhlmann D.R., Introduction to Ceramics, 2nd Edition, John Wiley & Sons, New York, 1976.

Course Outcomes:

1. Summarizing the concepts of material science properties in the design and development of mechanical systems.
2. Creativeness in new systems components and processes in the field of engineering.
3. Interpreting the heat treatment process and types of alloys for mechanical engineering applications useful to the society.
4. Produce different methods of composite materials for automobile and aeronautical applications.
5. To recalling relevant knowledge from long term memory in types of polymers.

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II Year B. Tech, ME-ISem	**3**	**0**	**3**

(R18A0306) MACHINE DRAWING

Course Objectives:

1. To visualize an object and convert it into a drawing.
2. To gain knowledge of conventional representation of various machining and mechanical details as per IS.
3. To gain knowledge of threads, bolts, nuts, stud bolts, tap bolts, set screws,Keys, cottered joints and knuckle joint.
4. To gain knowledge of Rivetedjoints, shaftcoupling, pipe joints.
5. To become conversant with 2-D and 3-D drafting

MACHINE DRAWING CONVENTIONS:

1. Need for drawing conventions –Introduction to IS conventions.

2. Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears.

3. Methods of dimensioning, general rules for sizes and placement of dimensions for holes, canters curved and tapered features.

4. Title boxes, their size, location and details -common abbreviations & their liberal usage

5. Types of Drawings –working drawings for machine parts.

I. DRAWING OF MACHINE ELEMENTS AND SIMPLE PARTS:

Selection of Views, additional views for the following machine elements and parts with everydrawing proportion.

a) Screwed fasteners: Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.

b) Keys, Cottersand Pin joints:

i) Saddle keys, sunk keys

ii) Cotter joint with sleeve, cotter joint with socket &spigot ends, cotter joint with a gib.

iii) knuckle joint

c) Riveted joints for plates

d) Shaft couplings:

i) Rigid couplings-sleeve or muff couplings, Flanged couplings

ii) Flexible couplings-Bushed pin type flanged coupling, compression coupling

iii) Dis-engaging couplings-claw coupling, cone coupling

iv)Non-Aligned couplings-Universal coupling(Hooke's Joint),Oldham coupling, cushion coupling&spigot and socket pipe joint.

e) Journal, pivot and collar and foot step bearings.

II. ASSEMBLY DRAWINGS:

Drawings of assembled views for the part drawings ofthe following using conventions and easydrawing proportions.

a) Engine parts –stuffing box, cross head, Eccentric, Petrol Engine connecting rod.

b) Other machine parts -Screws jack, Machine Vice, Plummer block, Tailstock.

c) Valves:spring loaded safety valve, feed check valve .

NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

TEXT BOOKS:

1. Machine Drawing –K.L.Narayana, P.Kannaiah&K.VenkataReddy / New Age/ Publishers

2. Machine Drawing –Dhawan, S.Chand Publications

3. Machine Drawing BySiddeswar.N&Kannaiah.P and V.V.S Sastry.

REFERENCE BOOKS:

1. Machine Drawing –P.S.Gill.

2. Machine Drawing –Luzzader

3. Machine Drawing –Rajput

Course Outcomes:

1. Student will be able to Visualize and prepare detail drawing of a given object.
2. Student will able to draw threads, bolts, nuts, stud bolts, tap bolts, set screws,Keys, Cottered joints and knuckle joint.
3. Draw Riveted joints, shaft coupling, pipe joints.
4. Draw details and assembly of mechanical systems, Read and interpret a given drawing
5. Create 2-D and 3-D models using any standard CAD software with manufacturing considerations.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

L	T/P/D	C
3	-	3

(R18A0307) KINEMATICS OF MACHINERY

Course Objectives:

1. To impart knowledge on various types of Mechanisms and synthesis
2. To Synthesize and analyze 4 bar mechanisms
3. To impart skills to analyse the position, velocity and acceleration of mechanisms
4. To perform synthesis of mechanism by analytical and graphical method
5. To familiarize higher pairs like cams and principles of cams design
6. To study the relative motion analysis and design of gears, gear trains.

UNIT-I

Mechanisms : Elements or Links , Classification, Rigid Link, flexible and fluid link, Types of kinematic pairs , sliding, turning, rolling, screw and spherical pairs lower and higher pairs, closed and open pairs, constrained motion, completely, partially or successfully constrained and incompletely constrained .

Machines : Mechanism and machines, classification of machines, kinematic chain , inversion of mechanism, inversion of mechanism , inversions of quadric cycle, chain , single and double slider crank chains.

UNIT-II

Straight Line Motion Mechanisms: Exact and approximate copiers and generated types Peaucellier, Hart and Scott Russul Grasshopper Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

Steering Mechanisms: Conditions for correct steering Davis Steering gear, Ackermans steering gear velocity ratio.

Hooke's Joint: Single and double Hookes joint Universial coupling application problems.

UNIT-III

Kinematics: Velocity and acceleration - Motion of link in machine - Determination of Velocity and acceleration diagrams - Graphical method - Application of relative velocity method four bar chain.

Plane motion of body: Instantaneous center of rotation, centroids and axodes - relative motion between two bodies - Three centres in line theorem - Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT-IV

Cams: Definitions of cam and followers their uses Types of followers and cams Terminology Types of follower motion - Uniform velocity Simple harmonic motion and uniform acceleration. Maximumm velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers: Roller follower circular cam with straight, concave and convex flanks.

UNIT-V

Gears: Higher pairs, friction wheels and toothed gears types law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding phenomena of interferences. Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact - Introduction to Helical, Bevel and worm gearing.

Gear Trains: Introduction - Train value - Types - Simple and reverted wheel train

Epicycle gear Train. Methods of finding train value or velocity ratio - Epicycle gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Kinematics of Machinery – Special Edition. MRCET, McGrahill Publishers.
2. Theory of Machines by Thomas Bevan/ CBS
3. Theory of machines/ PL. Balaney/khanna publishers.

REFERENCE BOOKS:

1. The theory of Machines /Shiegley/ Oxford.
2. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age International Publishers
3. Theory of Machines / R.K Bansal/Fire Wall media Publisher

Course Outcomes:

1. Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms.
2. Analyze the planar mechanisms for position, velocity and acceleration.
3. Synthesize planar four bar and slider crank mechanisms for specified kinematic conditions.
4. Design cams and followers for specified motion profiles
5. Evaluate gear tooth geometry and select appropriate gears for the required applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME – I Sem

L	P	C
0	3	1.5

(R18A0381) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Objectives:

1. To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps at constant speed and head.
2. To provide practical knowledge in verification of principles of fluid flow.
3. To calculate c_d, c_c, c_v and Coefficient of impact of various hydraulic systems
4. To understand Major and minor losses.
5. Student able to learn about measuring pressure, discharge and velocity of fluid flow.

List of Experiments

1. Determination of coefficient of discharge of Orifice meter.
2. Determination of coefficient of discharge of Venturimeter.
3. Determination of friction factor for a given pipe line.
4. Verification of Bernoulli's theorem.
5. Determination of loss of head in a pipeline.
6. Performance Test on Single Stage Centrifugal Pump.
7. Performance Test on Multi Stage Centrifugal Pump.
8. Performance Test on Reciprocating Pump.
9. Performance Test on Pelton Wheel.
10. Performance Test on Francis Turbine.
11. Performance Test on Kaplan Turbine.
12. Determination of Impact of Jet on Vanes

Note: Total 10 experiments are to be conducted.

Course Outcomes:

1. To provide the students' knowledge in calculating performance analysis in turbines.
2. Students exposure to study various operating characteristics of Centrifugal pump and Reciprocating pump.
3. Analyze a variety of fluid flow devices and utilize fluid mechanics principles in design.
4. Get Exposure to verification of Bernoulli's Theorem.
5. To provide the students with a solid foundation in fluid flow principles.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - I Sem

L	P	C
0	3	1.5

(R18A0382) MATERIALS ENGINEERING LAB

Course Objectives:

1. To Remembering the composition of metals, mechanical properties depending upon their micro structure.
2. To Understand the Heat treatment methods and their effect on micro structure of materials.
3. To applying the procedure for Micro Structure of pure metals.
4. To Know the Hardness of steels by different tests.
5. To learn the processing of different materials in the lab.

List of Experiments:

1. To Prepare the specimen by mounting powder.
2. To the study of Microstructure of Low, Medium & High carbon steels.
3. To the study of Microstructure Cast Irons. (Grey cast Iron & White cast Iron).
4. To the study of Microstructure Non – Ferrous pure metals. (Copper&Aluminum).
5. To the study of Microstructure Non-Ferrous alloys. (Brass & Bronze).
6. To the study of Microstructure Heat treated steels.
7. To find out the hardenability of steels by Jominy End Quench Test.
8. To find out the hardness of various treated and untreated steels.
9. Study of the Composite Material with the help of UTM.
10. Study of Microstructure of Composite Material subjected to tensile testing.
11. Join the sheets using Ultrasonic Joining process.

Note: Total 10 experiments are to be conducted.

Course Outcomes:

1. Summarizing can understand micro structures of different material.
2. Different heat treatment methods and change of mechanical properties based on micro structure of methods.
3. Produce different methods in Iron carbon equilibrium diagrams for material science applications
4. Find out the hardenability of the steels Jominy End Quench Test.
5. Understand the processing of different materials in the lab.

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II Year B.Tech. I Sem	L	T/P/D	C
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(R18A0014) ENVIRONMENTAL STUDIES (Mandatory Courses)

Course Objectives:

1. To understand the importance of ecological balance for sustainable development
2. To understand the importance of Natural resources
3. To understand the impacts of developmental activities and mitigation measures for recognizing each and every action of us, reflects on the environment and vice versa.
4. To understand waste management.
5. To understand the Social Issues and the Environment related issues.

UNIT I- ECOSYSTEMS

Definition Structure and function of an ecosystem, Food chain and Food Web, Ecological Pyramids.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on importance of Environmental Education

UNIT II- NATURAL RESOURCES

Introduction: definition of Natural Resources Types

Forest resources- Uses, Causes and consequences of deforestation, Water resources Benefits and problems of DAMs, Energy resources-Renewable and Non-renewable energy resources with Examples.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Natural Resources

UNIT III- ENVIRONMENTAL POLLUTION

Pollution – Sources, effects and control of Air, Climate change-ozone layer depletion, Global warming/greenhouse effect.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Environmental pollution.

UNIT IV- WASTE MANAGEMENT

Sources Types effects and management of solid waste, E-waste and its management.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Cleanliness, segregation of waste and Swacha-Bharath.

UNIT V- Social Issues and the Environment

Concept, threats and strategies of sustainable development, Importance and need for awareness for Environmental Education value orientated environmental education.

*Activity: Poster making/Seminar/ Slogans making/ Group discussion on Social Issues and the Environment.

TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international Publishers.

2. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.

2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.

3. Environmental Science by Daniel B.Botkin& Edward A.Keller, Wiley INDIA edition.

4. Principles of Environmental Science by William . P. Cunnningham& Mary Inn Cunnningham Tata McGRAW –Hill Publishing Company Ltd.

5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

Course Outcomes:

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of Ecological principles and environmental regulations which in turn will help in sustainable development
2. This course will sensitise the students through activities assigned to them after every unit.
3. This course will help the students understand the complex relationships between natural and human systems.
4. Will be able to understand waste management.
5. Will be having knowledge the impacts of developmental activities and mitigation measures for recognizing each and every action of us, reflects on the environment and vice versa.

MALLAREDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

L	P	C
3	0	3

(R18A0308) APPLIED THERMODYNAMICS

Course Objectives:

1. Introduction, Engine Types and their Operation. Application of the principles of thermodynamics to components and systems.
2. Understand and describe the gas exchange and combustion processes in diesel engines.
3. Good understanding of the various IC engines, Compressors and cycles for electricity generation.
4. The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behavior of various systems
5. Student have knowledge of methods of analysis and design of complicated thermodynamic systems

UNIT-I

Basic Concepts: Rankine cycle - Schematiclayout, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance - Regeneration & reheating

Boilers: Classification - Working principles with sketches including H.P. Boilers - Mountings and Accessories - Working principle.

UNIT-II

Steam Nozzles: Function of nozzle - Applications and Types- Flow through nozzles- Thermodynamic analysis.

Steam Condensers: Requirements of steam condensing plant - Classification of condensers - Working principle of different types.

UNIT-III

Steam Turbines: Classification - Impulse turbine; Mechanical details - Velocity diagram - Effect of friction - Power developed, Axial thrust, Blade or diagram efficiency - Condition for maximum efficiency.

Reaction Turbine: Mechanical details - Principle of operation, Thermodynamic analysis of a stage, Degree of reaction - Velocity diagram - Parson's reaction turbine - Condition for maximum efficiency.

UNIT-IV

Gas Turbines: Simple gas turbine plant - Ideal cycle, essential components - Parameters of performance - Actual cycle - Regeneration, Inter cooling and Reheating - Closed and Semi - closed cycles - Merits and Demerits.

UNIT-V

Jet Propulsion: Principle of Operation - Classification of jet propulsive engines - Working Principles with schematic diagrams and representation on T-S diagram- Thrust, Thrust Power and Propulsion Efficiency - Turbo jet engines - Needs and Demands met by Turbo jet - Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation - Methods.

Rockets: Application - Working Principle - Classification - Propellant Type - Thrust, Propulsive Efficiency - Specific Impulse - Solid and Liquid propellant Rocket Engines

TEXT BOOKS:

1. Thermal Engineering / Rajput / Lakshmi Publications.
2. Gas Turbines / V. Ganesan / TMH.
3. Thermal Engineering /P.L. Ballaney / Khanna Publishers, NewDelhi.

REFERENCE BOOKS:

1. Gas Turbines and Propulsive Systems / P. Khajuria & S.P. Dubey / Dhanapatrai Pub.
2. Thermal Engineering / R.S. Khurmi& J.K. Gupta / S. Chand Pub.
3. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot

Course Outcomes:

1. To be able to recognize main and supplementary elements of SI and CI engines and define operational principles.
2. To be able to describe the most important combustion concepts and problems in concern with SI engines and CI engines.
3. To be able to analyze energy distribution in an internal combustion engines.Develop problem solving skills through the application of thermodynamics.
4. To understand the velocity triangles in compressors. Solve problems associated with Rotodynamic compressors.
5. Solve problems associated with reciprocating compressors and expanders and internal combustion engines.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
II Year B. Tech ,ME-II Sem	**3**	**0**	**3**

(R18A0309) STRENGTH OF MATERIALS

Course Objectives:

1. To understand the nature of stresses induced in material under different loads.
2. To plot the variation of shear force and bending moments over the beams underdifferent types of loads.
3. To understand the behavior of beams subjected to shear loads.
4. To understand the behavior of beams under complex loading.
5. To analyze the cylindrical shells under circumferential and radial loading

UNIT-I

Simple Stresses & Strains : Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic moduli & the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT-II

Shear Force and Bending Moment Diagrams: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure.

UNIT-III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T, sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T sections.

UNIT-IV

Deflection of Beams: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods –Determination of slope and deflection for cantilever and simply supported beams subjected to point loads,- U.D.L uniformly varying load..

UNIT-V

Torsion of Circular Shafts: Theory of pure torsion, Derivation of torsion equations: T/J=q/r=Nθ/L- Assumptions made in theory of pure torsion-Torsional moment of resistance– Polar section modulus – Power transmitted by shafts.

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders.

TEXT BOOKS:

1. Strength of Materials by R.K. Bansal ,Laxmi Publications 2010.
2. Strength of materials by Sadhu Singh.Khanna Publications.
3. Strength of Materials by S.Timshenko

REFERENCE BOOKS:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Strength of materials by Bhavikatti, Lakshmi publications.
3. Mechanics of Structures Vol-III, by S.B.Junnarkar.

Course Outcomes:

1. Determine the simple stresses and strains when members are subjected to axial loads.
2. Draw the shear force and bending moment diagrams for the beam subjected to different loading conditions.
3. Evaluate stresses induced in different cross-sectional members subjected to shear loads.
4. Evaluate the deflections in beams subjected to different loading conditions.
5. Analyze the Shafts and thick cylindrical shells.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

L	T/P/D	C
3	1	3

(R18A0310) DYNAMICS OF MACHINERY

Course Objectives:

1. To study about gyroscope and its effects during precession motion of moving vehicles.
2. To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.
3. Able to learn about the working of Clutches, Brakes, Dynamometers and Fly wheel.
4. To study about the balancing, unbalancing of rotating masses and the effect of Dynamics of undesirable vibrations.
5. To understand the working principles of different type governors and its characteristics.

UNIT-I

Precession: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

UNIT-II

Static and Dynamic Force Analysis of Planar Mechanisms: Introduction -Free Body Diagrams – Conditions for equilibrium – Two, Three and Four Members – Inertia forces and D'Alembert's Principle – planar rotation about a fixed centre.

Friction in Machine Elements: Inclined plane-Friction of screw and nuts – Pivot and collars-uniform pressure, uniform wear-friction circle and friction axis: lubricated surfaces-boundary friction-film lubrication.

UNIT–III

Clutches: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.

Brakes and Dynamometers: Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operations.

Turning Moment Diagram and Fly Wheels: Turning moment – Inertia Torque connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

UNIT–IV

Balancing: Balancing of rotating masses Single and multiple – single and different planes.

Balancing of Reciprocating Masses- Primary, Secondary, and higher balancing of reciprocating masses. Analytical and graphical methods.

Vibration: Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration, Vibration Isolation & Transmissibility Whirling of shafts.

UNIT–V

Governers : Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxiliary springs. Sensitiveness, isochronism and hunting.

TEXT BOOKS:

1. Theory of Machines / Thomas Bevan / CBS Publishers
2. Theory of Machines / Jagadish Lal &J.M.Shah / Metropolitan.
3. Theory of machines / Khurmi/S.Chand Publications

REFERENCE BOOKS:

1. Theory of Machines / Shiegly / MGH Publishers.
2. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age International Publishers
3. Theory of Machines / S.S Ratan/ Mc. Graw Hill Publi*sh*ers

Course Outcomes:

1. Knowledge acquired about Gyroscope and its precession motion.
2. Able to predict the force analysis in mechanical system and able to solve the problem.
3. The student will learn about the kinematics and dynamic analysis of machine elements.
4. Ability to understand the importance of balancing and implications of computed results in dynamics to improve the design of a mechanism
5. Student gets the exposure of different governors and its working principle.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

L	T/P/D	C
3	0	3

(R18A0311) MANUFACTURING PROCESSES

Course Objectives:

1. The primary objective of this course is to introduce the concept of manufacturing technology with the help of various processes widely employed in industries.
2. The course consists of casting, welding, sheet metal forming, extrusion and forging processes with the related details of equipment and applications.
3. To understand various metal working process. To appreciate the capabilities, advantages and the limitations of the processes.
4. To understand the various concepts of drawing, its classification and their applications.
5. To understand the various concepts of metal forming and forging along with their applications.

UNIT-I:

Casting: Introduction, Steps involved in Design of Casting – Types of Patterns and allowances, Principles of Gating and its types, Solidification of Casting, Risers- Types, function, Cores: Material, Types, advantages & limitations. Special Casting processes. Melting of metal by cupola operation.

Advanced Casting Processes: Metal mould casting- Low & High Pressure, Continuous casting, Squeeze casting, Vacuum mould casting, Evaporative pattern casting, Ceramic shell casting.

UNIT-II:

Welding: Introduction, Classification –Types of welds and welded joints, Welding Positions, Detailed Classification of Gas, Arc, Forge, Resistance, Thermit and Plasma (Air and water) welding, Soldering & Brazing. Heat affected zones in welding, welding defects – causes and remedies – Destructive & Nondestructive testing of welds.

Cutting of Metals: Oxy – Acetylene Gas cutting, Water Plasma

Advanced Welding Processes: Electron beam Welding, Laser beam welding, Friction Stir Welding, Heat flow welding, Ultrasonic Welding.

UNIT-III:

Metal Forming: Introduction, Strain Hardening, Recovery, Recrystallization and Grain growth, forming processes - Bending, Coining, embossing etc.

Hot and Cold working processes: Rolling and types of Rolling and Roll mills, Injection and blow molding.

Advanced Metal Forming Process: Details of High energy rate forming process, Electro Magnetic Forming, Explosive Forming, Electro-Hydraulic Forming, Stretch Forming, Contour Roll forming.

UNIT-IV:

Extrusion and Forging: Basic Extrusion process and types, Forging operations and its classification, drawing: wire and tube drawing, Swaging, Blanking, Piercing, Punching and Trimming.

UNIT-V:

Additive manufacturing: Introduction to Rapid Prototyping, material, applications, limitations, Classification of Rapid Manufacturing Process, Traditional Prototyping vs Rapid Prototyping.

Additive Manufacturing Techniques: Photo polymerization, Stereo lithography, Powder Bed Fusion, Selective Laser Sintering, Electron Beam Melting, Fused Deposition Modeling, 3D Printing, Laminated Object Manufacturing, Laser Engineered Net Shaping and Direct Metal Deposition.

TEXTBOOKS:

1. Manufacturing Technology, P.N.Rao,TMH
2. Manufacturing Technology, Kalpak Jain, Pearson education.
3. Production Technology, R.K.Jain

REFERENCE BOOKS:

1. Principles of Metal Castings, Rosenthal.
2. Welding Process, Parmar
3. Manufacturing Technology, R.K. Rajput, Laxmi Pub
4. Manufacturing Engineering &Technology, Kalpak Jain,S.

Course Outcomes:

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Acquire knowledge and hands-on competence in applying the concepts of manufacturing science in the design and development of mechanical systems.
3. Competence to design a system, component or process to meet societal needs within realistic constraints.
4. Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
5. An ability to formulate solve complex engineering problem using modern engineering and information Technology tools.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech MECH –II Sem **L T/P/DC**

3 -/-/- 3

(R18A0024) PROBABILITY AND STATISTICS

Course Objectives:

1. To understand a random variable that describes randomness or an uncertainty in certain realistic situations which can be either discrete or continuoustype.
2. To learn functions of multiple random variables through joint distributions since the random situations are described as functions of multiple randomvariables.
3. To learn some of the important probability distributions like Binomial, Poisson Distributions (discrete case) and the Normal Distribution (continuouscase).
4. To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independentvariable.
5. To make inferences about a population from sample data(large and small samples) using probabilitytheory.

UNIT – I

Random Variables

Single and multiple random variables -discrete and continuous. Probability distribution function, mass function and density function of probability distributions.Mathematical expectation and variance.

UNIT-II

Probability distributions

Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and normal distribution – properties, mean and variance.

UNIT –III

Correlation and Regression

Correlation -coefficient of correlation, rank correlation. Regression-regression coefficients, lines of regression.

UNIT –IV: Sampling

Sampling: Definitions of population, sampling, statistic, parameter - types of sampling - expected values of sample mean and variance, standard error - sampling distribution of means and variance. Estimation - point estimation and interval estimation.Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, critical region - confidence interval - Level of significance, one tailed and two tailed test.

Unit-V: Statistical Inferences

Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, and difference of proportions.

Small samples: Test for single mean, difference of means, test for ratio of variances (F-test) - Chi-square test for goodness of fit and independence of attributes.

TEXT BOOKS:

1. Fundamental of Statistics by S.C. Gupta, Himalaya PublishingHouse.
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K. Kapoor, Sultan Chand Publishers.
3. Higher Engineering Mathematics by B.S. Grewal, KhannaPublishers.

REFERENCES:

1. ProbabilityandStatisticsforEngineersandScientistsbySheldonM.Ross ,Academic Press.
2. Probability and Statistics by Dr.T.K.V Iyengar , B.KrishnaGandhi ,S. Ranganatham& M V S S A N Prasad. S ChandPublishers.

Course Outcomes:

At the end of the course the students are able to:

1. Describe randomness in certain realistic situation which can be either discrete or continuoustype.
2. Provide very good insight which is essential for industrial applications by learning probabilitydistributions.
3. Make data-driven decisions by using correlation andregression.
4. Understand the importance of sampling distribution of a given statistic of a random sample.
5. Draw statistical inference using samples of a given size which is taken from a population and to apply statistical methods for analyzing experimentaldata.

OPEN ELECTIVE - I

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B.Tech II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A0351) INTELLECTUAL PROPERTY RIGHTS

(OPEN ELECTIVE – I)

Course Objectives:

1. To create an understanding on Intellectual Properties and the importance of it.
2. To acquire knowledge on Trademarks, Trade secrets & unfair completion methods.
3. To create awareness on the protection of copyrights and patents.
4. To attain basic understanding of Cyber laws, Cyber Crime and get an understanding of Privacy of Data.
5. To gain knowledge on international aspects and the Emerging Trends in IPR.

UNIT - I:

Introduction: Introduction to Intellectual property, types of intellectual property, importance of intellectual property rights, agencies Responsible for Intellectual property Registration, Regulatory – Compliance and Liability Issues.

UNIT - II:

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, Transfer of Rights, protectable matter, selecting and evaluating trade mark, Registrations of Trade Marks, Claims.

Trade Secrets: Determination of trade secret status, liability for misappropriations of trade secrets, protection for submission.

Unfair competition- Misappropriation right of publicity, false advertising

UNIT - III:

Copy rights: Fundamental of copy right, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, notice of copyright.

Patents: introduction, patent searching process, ownership rights and transfer.

UNIT - IV:

Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

UNIT - V:

New development of Intellectual Property: Emerging trends in trade mark; copy rights, patent, International overview on intellectual property.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah, E. Bouchoux, cengagelearning.
2. Cyber Law. Text & Cases, South-Western's Special Topicscollections.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi
4. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
5. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
6. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
7. Intellectual Property Rights: C B Raju: ISBN-8183870341

Course Outcomes:

Student will be able to:

1. Prepare and protect the Inventions, startup ideas and rights of patents and copy rights etc.,
2. Gain knowledge on Trademarks and Trade Secrets.
3. Brings awareness on the various types of Unfair Competition and gets well versed with exposure to licensing and transfer of Copyrights and Patents
4. Attain awareness of Cyber laws and Cyber Crime, to protect the data from Cybercrime.
5. Comprehend emerging trends in IPR globally.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B.Tech II Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**3**

(R18A0352) GREEN ENERGY SYSTEMS

(OPEN ELECTIVE – I)

Course Objectives:

1. The course aims to highlight the significance of alternative sources of energy.
2. Green energy systems and processes and provides the theory and working principlesof probable sources of renewable and green energy systems that are environmental friendly.
3. To understand the bio-mass conservation concetps.
4. To understand the energy efficient systems.
5. To understand thegreen buildings concepts.

UNIT-I

Introduction:

Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion –
types of PV cells, I-V characteristics.

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

Solar Energy Storage And Applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels,
I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants,thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

Energy Efficient Systems:(A) Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning),
demand site management.

(B) Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Green Buildings: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energy management.

TEXT BOOKS:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
2. Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
3. Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Ra.
2. Principles of Solar Energy / Frank Krieth& John F Kreider.
3. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa

Course Outcomes:

1. The student shall understand the principles and working of solar, wind, biomass, geo ,thermal, ocean energies .
2. Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.
3. The student will understand the Principles of bio-conversion, anaerobic/aerobic digestion.
4. Learn the concepts of different types of bio-gas digesters, gas yield, combustion characteristics of bio-gas.
5. Student will learn the concepts of Bio gas utilization for cooking, bio fuels, I.C. engine operation and economic aspect.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech.IISem

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OPEN ELECTIVE I

(R18A0555) DATA VISUALIZATION

Course Objectives:

- To learn different statistical methods for Data visualization.
- To understand the basics of R and Python.
- To learn usage of Watson studio.
- To understand the usage of the packages likeNumpy, pandas and matplotlib.
- To know the functionalities and usages of Seaborn.

UNIT I

Introduction to Statistics : Introduction to Statistics, Difference between inferential statistics and descriptivestatistics, Inferential Statistics- Drawing Inferences fromData, RandomVariables, Normal ProbabilityDistribution, Sampling, Sample Statistics and SamplingDistributions.

R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R.

UNIT II

Data manipulation withR: Data manipulation packages-dplyr,data.table, reshape2, tidyr, Lubridate, Data visualization withR.

Data visualization in Watson Studio: Adding data to datarefinery, Visualization of Data on WatsonStudio.

UNIT III

Python: Introduction toPython, How toInstall, Introduction to JupyterNotebook, Python scriptingbasics, NumpyandPandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and datetime columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools inPython- Introduction to Matplotlib, Basic plots usingmatplotlib, Specialized Visualization Tools usingMatplotlib, Advanced Visualization Tools usingMatplotlib- WaffleCharts, WordClouds.

UNIT V

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.
2. Hands on programming with R by Garrett Grolemund,Shroff/O'Reilly; First edition

3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress
2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc. \
3. The Comprehensive R Archive Network- https://cran.r-project.org
4. https://seaborn.pydata.org/
5. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization.
- Gain knowledge on R and Python
- Understand usage of various packages in R and Python.
- Demonstrate knowledge of Watson studio.
- Apply data visualization tools on various data sets.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B.Tech II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A0451) DIGITAL ELECTRONICS
(OPEN ELECTIVE – I)

Course Objectives:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,

AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM_ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits suing ROM, PLA, PAL.

TEXT BOOK:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India PVt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCES:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Analyse different methods used for simplification of Boolean expressions.
2. Design and implement Combinational and Sequential circuits.
3. Design and implement Synchronous and Asynchronous Sequential Circuits.
4. Explain about memories &Programmable logic devices.
5. Implement the concept of synchronous and asynchronous sequential circuits.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B.Tech II Sem

L	T/P/D	C
3	-/-/-	3

(R18A0551) DATABASE SYSTEMS
(OPEN ELECTIVE – I)

Course Objectives:

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS,History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations-Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated-Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's-Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF-Decompositions and desirable properties -

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan," Database System Concepts", McGraw-Hill, 6th Edition , 2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, “Database Management System”, McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,”Fundamentals of Database System,” Addison-Wesley Publishing, 5th Edition, 2008.
3. Date.C.J, “An Introduction to Database”, Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter rob, Carlos Coronel, “Database Systems – Design, Implementation, and Management”, 9th Edition, Thomson Learning, 2009.

Course Outcomes:

1. Demonstrate the basic elements of a relational database management system.
2. Ability to identify the data models for relevant problems.
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
4. Ability to explain issues of transaction processing and concurrency control.
5. Ability to select the database storage structures and access techniques.

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II Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A0553) DATA STRUCTURES USING PYTHON
(OPEN ELECTIVE I)

COURSE OBJECTIVES:

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and call them.
4. To use Python data structures lists, tuples, dictionaries.
5. To do input/output with files in Python.

UNIT I

Introduction to Python, Installation and Working with Python, Understanding Python variables Python basic Operators, Understanding python blocks, Python Data Types: Declaring and using Numeric data types: int, float,complex,Using string data type and string operations.

UNIT II

Control Flow- if, if-elif-else,loops ,For loop using ranges, string,Use of while loops in python,Loop manipulation using pass, continue, break and else,Programming using Python conditional and loops block,Python arrays.

UNIT III

Functions -Calling Functions, Passing Arguments, Keyword Arguments,Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.PowerfulLamda function in python.

UNIT IV

Data Structures-List Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions,Dictionary manipulation, list and dictionary in build functions

UNIT V

Sorting:Bubble Sort,Selection Sort,Insertion Sort,Mergesort,Quick sort.Linked Lists,Stacks,Queues

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into functions.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python Programs

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.
2. R. Nageswara Rao, "Core Python Programming", dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

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II Year B. Tech ME - II Sem

L	P	C
0	3	1.5

(R18A0383) STRENGTH OF MATERIALS LAB

Course Objectives:

1. To determine experimental data include universal testing machines and torsion equipment.
2. To determine experimental data for spring testing machine, compression testing machine, impact tester, hardness tester.
3. To determine stress analysis and design of beams subjected to bending and shearing loads using several methods.
4. To determine Flexural strength of a beam.
5. To determine experimental stress with fatigue and compression Tests.

LIST OF EXPERIMENTS

1. Tension test
2. Deflection test on Cantilever beam
3. Deflection test on simply supported beam
4. Torsion test
5. Spring test
6. Izod Impacttest
7. Shear test
8. Tensile test on composite materials using UTM
9. Charpy impact test on metal specimen
10. Flexural strength of a beam
11. Fatigue Testing machine
12. Compressive Test on Cube
13. Brinell hardness test
14. Rockwell hardness test

Note: Total 10 Experiments are to be conducted

Course Outcomes:

1. Analyse and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behaviour of materials.
2. Understand the basic concepts of stress, strain, deformation, and material behaviour under different types of loading (axial, torsion, bending).
3. Perform stress analysis and design of beams subjected to bending and shearing loads using several methods.
4. Calculate the stresses and strains in axially-loaded members subject to flexural loadings.
5. Ability to conduct compression tests and Fatigue of cast iron and steel.

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	L	P	C
II Year B. Tech ME - II Sem	**0**	**3**	**1.5**

(R18A0384) MANUFACTURING PROCESSES LAB

Course Objectives:

1. To know about the casting of different materials.
2. Study and Practice different welding processes.
3. To learn the operation of hydraulic press operation for different materials.
4. Understand the Process of blow and Injection Moulding.
5. To learn the Processing of different materials.

List of Experiments

1. To design and making of pattern - for one casting drawing.
2. To determine sand properties- Exercise -for strengths, and permeability.
3. To PrepareMould for Casting.
4. To prepare a butt joint with the specimens by Arc Welding.
5. To join the sheets by Spot Welding operation.
6. To join the specimens by TIG welding process.
7. To perform Plasma welding and Brazing.
8. To perform blanking & piercing operation.
9. To perform deep drawing and extrusion operation.
10. To prepare the product by Injection Moulding machine.
11. To prepare the product by Blow Moulding machine.
12. Making of components by 3D printing.

Note: Total 10 experiments are to be conducted.

Course Outcomes:

1. Learn about patterns and casting of metals.
2. Understand the concept of Arc, Spot, TIG welding and brazing process.
3. Understand the Process of simple, compound and progressive press and Hydraulic press
4. Learn the Moulding process of plastic materials
5. Understand the processing of different materials in the lab.

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B. TECH II YEAR II SEM (ME, ANE) L T/P/D /C

2/ - / - / - / -

(R180005)GERMAN

(Mandatory Course)

INTRODUCTION

This is the age of globalization. Faster communication, extensive travel, greater interaction, outsourcing of jobs, demand of skilled person had made the engineering graduates to learn GERMAN language. Nowadays Aircraft and mechanical domain require more and more graduates with minimum knowledge to speak in German language

German language has been one of the fastest learning language in the world. This course is customized according to the demand of the requirement in job industries.

Course Objectives:

1. To equip the students with the required vocabulary and accent to create new sentences, sentence pattern, correct pronunciation.
2. To make the students effective German language speakers.

UNIT 1

Basics of Deutsch

1.1 Introduction – (About German Country, Language & Culture)
1.2 Formal and Informal Greetings
1.3 Alphabet
1.4 Numbers (0-50)
1.5 Days of the week and Months of the year
Vocabulary, Exercises and Assignments

UNIT 2

Getting closer with Deutsch

2.1 Family
2.2 Seasons & Weather
2.3 Time & Directions, Days Of Weak, Months
2.4 Colours& Shapes, Numbers (51 – 100)
2.5 Subject Pronouns
Vocabulary, Exercises and Assignments

Unit 3

Construction of Simple Sentences

3.1 Formal Introduction
3.2 Asking Questions
3.3 Responding to the Questions
3.4 Simple Sentences
3.5 Articles, Numbers (101 And Above)
Vocabulary, Exercises and Assignments

Unit 4

Dialogue Writing

4.1 Introduce Oneself
4.2 Introduce Others
4.3 At the Restaurant
4.4 At the Railway Station
4.5 At the University
Vocabulary, Exercises and Assignments

REFERENCE BOOKS

1. Collins easylearning GERMAN dictionary
2. Hallo deutsch – Parulsharma
3. Studio D A1 – Hermann
4. So gehtdas – New Saraswati book house
5. Practice German language for beginners – Dominic
6. German Made easy – Diego Agundez

Course Outcomes:

Student will be able to:

1. stand ahead of getting the opportunity in the Job market by learning German language.
2. learn German language with engineering degree that will give them a sense of identity among the competitive global engineering industry.
3. learn German language on a regular basis that will help them in improving multi-lingual ability.

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III Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0312) COMPUTER INTEGRATED MANUFACTURING TECHNOLOGIES

Course Objectives:

1. Learn about the geometry of metal cutting theory, mechanism of chip formation and mechanics of orthogonal cutting and merchant's force diagram.
2. Gain the knowledge and features, working principles and applications of lathe, shaper, planer, slotter, milling, drilling, and machines.
3. Learn about the ways to reduce the surface roughness by using different Machining processes.
4. To understand computer aided planning and control and computer monitoring.
5. To understand APT and CNC programming concepts.
6. To know about tooling for CNC machines.

UNIT – I

Metal cutting theory: Elements of cutting process – Geometry of single point tool and angles, chip formation and types of chips, built up edge and its effects- chip breakers. Mechanics of orthogonal cutting,cutting forces – cutting speeds, feed, depth of cut, tool life, coolants, mechanability. Lathe Machine: Principle of working, specification of lathe and types of lathes, operations of lathe and work holding and tool holding devices

UNIT - II

Shaping, slotting and planning machines:-Principles of working – classifications, operations performed, machining time calculations.Drilling and Boring Machines – Principles of working, specifications, types, operations performed – tool holding devices – twist drill – Boring machines – Fine boring machines – Jig Boring machine. Deep hole drilling machine.

UNIT - III

Computer-Aided Programming: General information, APT programming, Examples Apt programming problems (2D machining only). NC programming on CAD/CAM systems, Introduction to CAD/CAM software, Automatic Tool Path generation. Tooling for CNC Machines: Interchangeable tooling system, preset and qualified tools, coolant fed tooling system, modular featuring, quick change tooling system, automatic head changers.

UNIT – IV

DNC Systems and Adaptive Control: Introduction, type of DNC systems, advantages and disadvantages of DNC, adaptive control with optimization, Adaptive control with constrains, Adaptive control of machining processes like turning, grinding. Post Processors for CNC:

Introduction to Post Processors: The necessity of a Post Processor, the general structure of a Post Processor, the functions of a Post Processor.

UNIT - V

Computer Aided Process Planning: Hybrid CAAP System, Computer Aided Inspection and quality control, Coordinate Measuring Machine, Limitations of CMM, Computer Aided Testing, Optical Inspection Methods, Artificial Intelligence and expert system: Artificial Neural Networks, Artificial Intelligence in CAD, Experts systems and its structures.

TEXT BOOKS

1. Computer Control of Manufacturing Systems / YoramKoren / McGraw Hill. 1983.
2. CAD/CAM Principles and Applications, P.N.Rao, TMH
3. Manufacturing Technology by P.N.Rao, Volume II, McGraw Hill
4. Production Technology by R.K. Jain and S.C. Gupta, Khanna Publications

REFERENCES

1. CAD / CAM / CIM, Radhakrishnan and Subramanian, New Age
2. Principles of Computer Aided Design and Manufacturing, FaridAmirouche, Pearson
3. Computer Numerical Control Concepts and programming, Warren S Seames, Thomson.
4. Machine Tools – C Elanchezhian and M. Vijayan, Anuradha Publications
5. Workshop Technology – B.S.Raghu Vamshi – Vol II, Dhanpatrai publications

Course Outcomes:

1. Students should be able to understand the function of micro controllers and PLCs.
2. Apply Computer aided process planning, MRP and CNC part programming.
3. Understand the fundamentals of metal cutting, chip formation, cutting forces involved in orthogonal metal cutting, and different cutting forces will be learned.
4. Analyze the classification of lathe, shaper, planer, slotter, milling, drilling, and machines.
5. Evaluate the surface finishing operations with abrasive processes such as Grinding and broaching machines, types and working principle.

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III Year B. Tech, ME-I Sem

L	T/P/D	C
3	1	3

(R18A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyse the financial formats of the organisation for smooth running of the business.

Course Outcomes:

Students should be able,

- To understand the basic economic principles, forecast demand and supply.
- To estimate cost and understand market structure, pricing practices.
- To interpret the financial results of the organisation.

Unit-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.

Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

Unit-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing;

Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

Unit-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

References:

1. Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4. P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5. S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
6. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

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III Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0313) INTERNAL COMBUSTION ENGINES

Course Objectives:

1. Applications and the principles of thermodynamics to components and systems.
2. The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behavior of various systems
3. Student have knowledge of methods of analysis and design of complicated thermodynamic systems
4. Acquires knowledge about thermodynamic analysis for steam nozzles.
5. Acquires knowledge on condensers and steam turbines.

UNIT-I

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blow down-Loss due to Gas exchange process, Volumetric Efficiency. Loss due to Rubbing Friction, Actual and Fuel-Air Cycles of CI Engines.

I.C. ENGINES : Classification - Working principles, Valve and Port Timing Diagrams, Air – Standard, air-fuel and actual cycles - Engine systems – Fuel, Carburetor, Fuel Injection System, Ignition, Cooling and Lubrication.

UNIT-II

Combustion in S.I. Engines : Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Type of Abnormal combustion, pre-ignition and knocking (explanation of) – Fuel requirements and fuel rating, anti knock additives – combustion chamber – requirements, types.

Combustion in C.I. Engines : Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, compression and combustion induced turbulence – open and divided combustion chambers and nozzles used – fuel requirements and fuel rating.

UNIT-III

Testing and Performance of IC Engines : Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart.

UNIT-IV

Compressors – Classification –positive displacement and roto dynamic machinery – Power producing and power absorbing machines, fan, blower and compressor – positive displacement and dynamic types – reciprocating and rotary types.

Reciprocating: Principle of operation, work required, Isothermal efficiency volumetric efficiency and effect of clearance, stage compression, undercooling, saving of work, minimum work condition for stage compression.

Rotary (Positive displacement type) : Roots Blower, vane sealed compressor, Lysholm compressor – mechanical details and principle of working – efficiency considerations.

UNIT-V

Dynamic Compressors : Centrifugal compressors: Mechanical details and principle of operation –velocity and pressure variation. Energy transfer-impeller blade shape-losses, slip factor, power input factor, pressure coefficient and adiabatic coefficient – velocity diagrams – power.

Axial Flow Compressors : Mechanical details and principle of operation – velocity triangles and energy transfer per stage degree of reaction, work done factor - isentropic efficiency-pressure rise calculations – Polytropic efficiency.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN- TMH
2. Thermal Engineering / Rajput / Lakshmi Publications.
3. IC Engines – Mathur & Sharma – Dhanpath Rai & Sons.

REFERENCE BOOKS:

1. Thermal Engineering / Rudramoorthy - TMH
2. Thermodynamics & Heat Engines / R.S. Yadav/ Central Book Depot., Allahabad
3. Thermal Engineering – R.S. Khurmi&J.K.Gupta – S.Chand

Course Outcomes:

1. Recognize and recall the importance of thermal power plant and its thermodynamic analysis for improvement of efficiency.
2. Understand the operation of steam boiler, steam nozzle, condenser and steam turbine.
3. Able to do thermodynamic analysis for steam nozzles, condensers and steam turbines.
4. Evaluate the thermodynamic efficiency of gas turbine and jet propulsion systems.
5. Create the jet propulsion system and do the thermodynamic analysis for better efficiency.

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L	T/P/D	C
3	0	3

(R18A0314) MACHINE DESIGN-I

NOTE: Design Data Book is permitted. Design of all components should include design for strength and rigidity apart from engineering performancerequirements.

Course objectives:

1. The students should be able to understand. Types of loading on machine elements and allowable stresses. To apply different materials of construction and their properties and factors determining the selection of material for various applications
2. To understand Stress concentration and the factors responsible. Determination of stress concentration factor; experimental and theoretical methods. • Fatigue strength reduction factor and notch sensitivity factor.
3. To develop the Knowledge on Basic failure mechanisms of riveted joints. Concepts of design of a riveted joint, welded joints and Bolted Joints to determine the forces in welds and riveted joints and formulate design solution for size of weld and size of rivet
4. To learn the design Procedure for the different machine elements such as fasteners, couplings, keys, axially loaded joints etc.
5. To learn the design Procedure for the different Shafts under loading condition, able to know various shafts coupling.

UNIT – I

INTRODUCTION:

General considerations in the design of Engineering Materials and their properties – selection – Manufacturing consideration in design.BIS codes of steels.

DESIGN FOR STATIC STRENGTH: Simple stresses – Combined stresses – Torsional and Bending stresses – Impact stresses – Stress strain relation – Various theories of failure – Factor of safety – Design for strength and rigidity– preferrednumbers.Theconceptofstiffnessintension,bending,torsionandcombinedsituations.

UNIT – II

DESIGN FOR FATIGUE STRENGTH : Stress concentration – Theoretical stress Concentration factor – Fatigue stress concentration factor- Notch Sensitivity – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Gerber's curve, Goodman's line – Modified Goodman's line – Soderberg's line.

UNIT – III

RIVETED, WELDED AND BOLTED JOINTS:

Riveted joints- Methods of failure of riveted joints-strength equations-efficiency of riveted joints-eccentrically loaded rivetedjoints.

Welded joints -Design of fillet welds-axial loads-circular fillet welds under bending, torsion.

Welded joints under eccentric loading.
Bolted joints – Design of bolts with pre-stresses – Design of joints under eccentric loading – locking devices – bolts of uniformstrength.

UNIT – IV
KEYS, COTTERS AND KNUCKLE JOINTS : Design of keys-stresses in keys - cottered joints-spigot and socket, sleeve and cotter, jib and cotter joints-Knuckle joints.

UNIT – V
SHAFTS : Design of solid and hollow shafts for strength and rigidity – Design of shafts for combined bending and axial loads – Shaft sizes – BIS code. Use of internal and external circlips, Gaskets and seals (stationary&rotary).
SHAFT COUPLINGS : Rigid couplings – Muff, Split muff and Flange couplings. Flexible couplings – Flange coupling (Modified).

TEXT BOOKS:

1. Machine Design by R.S.Khurmi and J.K.Gupta, S.ChandPublishers,New Delhi.
2. Machine Design, S MD Jalaludin, Anuradha Publishers.
3. Design of Machine Elements by V. Bhandari TMH

REFERENCE BOOKS:

1. Machine Design Data Book by S MD Jalaludin, Anuradha Publishers
2. Machine Design Data Book by P.S.G. College of Technology
3. Machine Design by Pandya and Shah, Chortar Publications.
4. Machine Design / R.N. Norton
5. Mechanical Engineering Design / JE Shigley.

Course Outcomes:

Studentwillbeableto:

1. Acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, and criteria of failure.
2. Understands the concepts of principal stresses, stress concentration in machine members and fatigue loading. Analyze the fluctuating loads that will cause failure in real parts using the Soderberg, Gerber and Goodman techniques.
3. Understand different welded and riveted joints structure and able to apply its knowledge to analyze its strength when subjected to simple, coplanar and eccentric loading
4. Explain and design the basic of mechanical design process of simple machine components like, key, cotter joints and coupling.
5. Design the solid, hollow shafts and to finding the critical speeds

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III Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0315)DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS

(PROFESSIONAL ELECTIVE 1)

Course Objectives:

1. To provide student with knowledge on the application of fluid power in process, construction and manufacturing Industries.
2. To study the fundamental principles, design and operation of hydraulic and pneumatic machines, components and systems and their application in recent automation revolution.
3. To provide students with an understanding of the fluids and components utilized in modern industrial fluid power system.
4. To develop a measurable degree of competence in the design, construction and operation of fluid power circuits.
5. To emphasize basic theory, components sizing, construction and function, how to read pneumatics and fluid power circuit diagrams using the correct symbols and troubleshooting techniques.

UNIT-I

FLUID POWER PRINICIPLES AND HYDRAULIC PUMPS

Introduction to Fluid power – Advantages and Applications – Fluid power systems – Types of fluids - Properties of fluids and selection – Basics of Hydraulics – Pascal's Law, Sources of Hydraulic power, Pump Classification – Construction, Working, Design, Advantages, and Disadvantages.

UNIT-II

HYDRAULIC ACTUATORS AND CONTROL COMPONENTS

Hydraulic Actuators: Cylinders – Types and construction, Application, Hydraulic cushioning – Hydraulic motors - Control Components: Direction Control, Flow control and pressure control valves – Types, Construction and Operation – Servo and Proportional valves.

UNIT-III

HYDRAULIC CIRCUITS AND SYSTEMS

Accumulators, Intensifiers, Industrial hydraulic circuits – Regenerative, Pump Unloading, Double-Pump, Pressure Intensifier, Air-over oil, Sequence, Reciprocation, Synchronization, Fail-Safe, Speed Control, Hydrostatic transmission, Mechanical hydraulic servo systems.

UNIT-IV

PNEUMATIC AND ELECTRO PNEUMATIC SYSTEMS

Properties of air – Perfect Gas Laws – Compressor – Filters, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust Valves, Pneumatic actuators, Design of Pneumatic circuit – Cascade method – Electro Pneumatic System.

UNIT-V

TROUBLE SHOOTING AND APPLICATIONS

Installation, Selection, Maintenance, Trouble Shooting and Remedies in Hydraulic and Pneumatic systems, Design of hydraulic circuits for Drilling, Surface grinding, Press and Forklift applications. Design of Pneumatic circuits for Pick and Place applications and tool handling in CNC Machine tools.

TEXT BOOKS:

1. Anthony Esposito, “Fluid Power with Applications”, Prentice Hall, 2009.
2. James A. Sullivan, “Fluid Power Theory and Applications”, Fourth Edition, Prentice Hall, 1997.

REFERENCES:

1. Shanmugasundaram.K, “Hydraulic and Pneumatic Controls”. Chand & Co, 2006.
2. Majumdar, S.R., “Oil Hydraulics Systems – Principles and Maintenance”, Tata McGRaw Hill, 2001.
3. Majumdar, S.R., “Pneumatic Systems – Principles and Maintenance”, Tata McGRaw Hill, 2007.
4. Dudley, A. Pease and John J Pippenger, “Basic Fluid Power”, Prentice Hall, 1987
5. Srinivasan.R, “Hydraulic and Pneumatic Controls”, Vijay Nicole Imprints, 2008
6. Joshi.P, Pneumatic Control”, Wiley India, 2008.
7. Jagadeesha T, “Pneumatics Concepts, Design and Applications “, Universities Press, 2015.

Course Outcomes:

Upon completion of this course, the students will be able to:

1. Identify hydraulic and pneumatic components and its symbol and usage.
2. Ability to design hydraulic and pneumatic circuits.
3. Identify and analyse the functional requirements of a power transmission system for a given application.
4. Ability to visualize how the hydraulic/pneumatic circuit will work to accomplish the function.
5. Ability to Design and understand the electro-hydraulic and electro-pneumatic circuits.

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III Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0316)INNOVATION AND DESIGN THINKING

(PROFESSIONAL ELECTIVE 1)

Course Objectives:

The objective of this subject is to provide knowledge of Innovation and Design Thinking

1. Understand the conceptual development techniques to find solution for a critical design issue.
2. Understand Principles to translate the conceptual ideas to engineering design.
3. Understand Principles of Design for Manufacturing and Assembly.
4. To know about the design for assembly principles
5. To know about the design for environment and design for recycling

UNIT-I

Introduction: Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.

Identification of Customer Need: Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing: Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly: Assembly Principles, Process, Worksheet, Assumptions.

Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment: Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. GenrichAltshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

REFERENCE BOOKS

1. The Art of Innovation, by Tom Kelley.
2. Design Thinking, by Nigel Cross.
3. The Design of Business: by Roger Martin.

Course Outcomes:

1. The importance of design in innovation.
2. Design tools and processes can generate innovative new ideas.
3. Design and design thinking to innovative in areas such as engineering, software development and business operations.
4. Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
5. To describe the various case studies for design for environment.

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III Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0317) MECHANICAL VIBRATIONS
(PROFESSIONAL ELECTIVE 2)

Course Objectives:

1. Fully understand and appreciate the importance of vibrations in mechanical design of machine parts
2. To understand the fundamentals of Vibration Theory
3. Operate in different vibratory conditions**.**
4. To know about different degrees of freedom.
5. To be able to mathematically model real-world mechanical vibration problems.

UNIT- I

Single degree of freedom systems : Un-damped and damped free vibrations; forcedvibrations coulomb damping; Response to excitation; rotating unbalance and support excitation; vibration isolation and transmissibility- Response to Non Periodic Excitations: unit impulse, unit step and unit Ramp functions; response to arbitrary excitations, The Convolution Integral; shock spectrum; System response by the Laplace Transformation method.

UNIT-II

Two degree freedom systems: Principal modes- Un-damped and damped free andforced vibrations; Un-damped vibration absorbers.

UNIT-III

Multi degree freedom systems: Matrix formulation, stiffness and flexibility influencecoefficients; Eigen value problem; normal modes and their properties; Free and forced vibration by Modal analysis; Method of matrix inversion; Torsional vibrations of multi- rotor systems and geared systems; Discrete- Time systems.

UNIT-IV

Vibration measuring instruments: Seismic instruments, vibrometers, velocity meters & accelerometers, frequency measuring devices-Fullarton and Fruhm Tachometers.

UNIT-V

Numerical methods: Raleigh’s stodola's, Matrix iteration, Rayleigh- Ritz Method andHolzer's methods.

TEXT BOOKS:

1. Mechanical Vibrations/Groover/Nem Chand and Bros
2. Elements of Vibration Analysis by Meirovitch, TMH, 2001
3. Mechanical Vibrations/Schaum Series/ McGraw Hill

REFERENCE BOOKS:

1. Mechanical Vibrations / SS Rao/ Pearson/ 2009, Ed 4,
2. Vibration problems in Engineering / S.P. Timoshenko.
3. Theory and Practice of Mechanical Vibrations/JS Rao & K. Gupta/New Age Intl. Publishers/Revised 2nd Edition.

Course Outcomes:

1. Ability to analyze the mechanical model of a linear vibratory system
2. To be able to model reciprocating and oscillatory motions of mechanical systems
3. To be able to model undamped and damped mechanical systems and structures
4. To be able to model single- and multi-degree of freedom systems
5. An ability to identify, formulate, and solve engineering problems

OPEN ELECTIVES II

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B.Tech. I Sem	L	T/P/D	C
	3	-/-/-	3

OPEN ELECTIVE III
(R18A0452) ROBOTICS & AUTOMATION

Course Objectives:

1. This introductory course is valuable for students who wish to learn about robotics through a study of industrial robot systems analysis and design.
2. This course is suited to students from engineering and science backgrounds that wish to broaden their knowledge through working on a subject that integrates multi-disciplinary technologies.
3. This course is to analyse the industrial robotic applications.
4. T understand the robot manipulators of their Kinematics and Kinetic control m.
5. The performance of manipulate can analyse through simulation by MATLAB.

UNIT – I

Introduction & Basic Definitions: History pf robots-robot anatomy, Coordinate Systems, Human arm Characteristics, Cartesian, Cylindrical, Polar, coordinate frames, mapping transform.

UNIT – II

Kinematics – Inverse Kinematics: Kinematics, Mechanical structure and notations, description of links and joints, DenavitHatenberg notation, manipulator transformation matrix, examples inverse kinematics.

UNIT – III

Differential Motion – Statics – Dynamic Modeling: Velocity Propagation along links, manipulator Jacobian – Jacobian singularities – Lagrange Euler formulation Newton Euler formulation basics of trajectory planning.

UNIT – IV

Robot Systems : Actuators Sensors and Vision: Hydraulic and Electrical Systems Including Pumps, valves, solenoids, cylinders, stepper motors, Encoders and AC Motors Range and use of sensors, Micro switches, Resistance Transducers, Piezo-electric, Infrared and Lasers Applications of Sensors : Reed Switches, Ultrasonic, Barcode Readers and RFID – Fundamentals of Robotic vision.

UNIT – V

Robots and Applications: Industrial Applications – Processing applications – Assembly applications, Inspection applications, Non Industrial applications.

TEXTBOOKS

1. Robotics and Control: R.K. Mittal and I.J. Nagarath, TMH 2003.
2. Introduction to Robotics – P.J. Mckerrow, ISBN: 0201182408

REFERENCES

1. Robotics – K.S. Fu, R.C. Gonzalez and C.S.G. Lee, 2008, TMH.

2. Introduction to Robotics – S. Nikv, 2001, Prentice Hall,
3. Mechatronics and Robotics: Design & Applications – A. Mutanbara, 1999, CRC Press.

Course Outcomes:

1. Upon the completion of this course, the student will be able to:
2. Describe the various elements that make an industrial robot system
3. Discuss various applications of industrial robot systems
4. Analyze robot manipulators in terms of their kinematics, kinetics, and control
5. Model robot manipulators and analyze their performance, through running simulations using a MATLAB-based Robot Toolbox
6. Select an appropriate robotic system for a given application and discuss the limitationsof such a system
7. Program and control an industrial robot system that performs a specific task.

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III Year B.Tech. I Sem

L	T/P/D	C
3	-/-/-	3

(R18A0551) INTRODUCTION TO JAVA PROGRAMMING

(OPEN ELECTIVE II)

Course Objectives:

1. To Create Java Programs That Leverage The Object-Oriented Features Of The Java Language, Such As Encapsulation, Inheritance And Polymorphism;
2. Use Data Types, Arrays And Strings;
3. Implement Error-Handling Techniques Using Exception Handling,
4. Create And Event-Driven GUI Using AWT Components.
5. Able to develop applications using Applet, awt and GUI Programming.

UNIT I

OOPConcepts: Dataabstraction,encapsulation,inheritance,Polymorphism, classes and objects, Procedural and object oriented programmingparadigms.

Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, BufferedReader class, Scanner class, StringTokenizer class, inner class.

UNIT II

Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III

Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V

GUI Programming with Java –AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT controls: Labels, button, text field, check box, and graphics.

Layout Manager – Layout manager types: border, grid and flow.
Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearsoneduction.
3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

Course Outcomes:

1. An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2. A competence to design, write, compile, test and execute straightforward programs using a high level language;
3. An appreciation of the principles of object oriented programming;
4. An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
5. Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
6. Be able to make use of members of classes found in the Java API.
7. Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements.

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III Year B.Tech. I Sem

L	T/P/D	C
3	-/-/-	3

(R18A01252) SOFTWARE PROJECT MANAGEMENT

OPEN ELECTIVE II

Objectives:

1. The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

UNIT-I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases .

UNIT-III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

Flows of the Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process, Pragmatic Planning.

UNIT-V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project

Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, “Software Project Management”, 1998, PEA.

2. Henry, “Software Project Management”, Pearson.

REFERENCE BOOKS:

1. Richard H.Thayer.” Software Engineering Project Management”, 1997, IEEE Computer Society.

2. Shere K.D.: “Software Engineering and Management”, 1998, PHI.

3. S.A. Kelkar, “Software Project Management: A Concise Study”, PHI.

4. Hughes Cotterell, “Software Project Management”, 2e, TMH. 88 5. Kaeron Conway, “Software Project Management from Concept to D

Course Outcomes:

1. Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
2. Compare and differentiate organization structures and project structures.
3. It focuses Implement a project to manage project schedule, expenses and resource to with the application of suitable project management tools.
4. Principles, techniques, methods & tools for model-based management of software projects, assurance of product quality.
5. Models are required for determining target values and for continuously controlling these values.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B.Tech. I Sem

L	T/P/D	C
3	-/-/-	3

(R18A0353) ENTERPRISE RESOURCE PLANNING

(OPEN ELECTIVE II)

Course Objectives:

1. To know the basics of ERP
2. To understand the key implementation of ERP
3. To know the business modules of ERP
4. To evaluate the current and future trends in ERP
5. To explain Organizational and Industrial impact; Success and Failure factors of ERP.

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition, 2006.

3. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

Course Outcomes:

1. To know the strategic importance of Enterprise Resource Planning.
2. To Understand and implement ERP in various Sectors.
3. To understand the business modules of ERP.
4. To explain the Future and current trends In ERP.
5. To understand the Industrial impact; Success and Failure factors of ERP.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech I Sem

L	T/P/D	C
3	-/-/-	3

(R18A0354) NANO TECHNOLOGY
OPEN ELECTIVE II

Course Objectives:

1. To learn about basis of Nano Materials.
2. In this course we focus on synthetic aspects for the design of nanostructured materials.
3. We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.
4. The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes(CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of these nanostructures.
5. The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band .structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano-particles,nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano-composites,

UNIT-II

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties.

Electrical properties: Switching glasses with nanoparticles, Electronic conduction with nano-particles.

Optical properties: Optical properties, special properties and the coloured glasses.

Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT–III

Synthesis Routes: Top &Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT–IV

Tools to Characterize Nanomaterials: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT–V

Applications of Nanomaterials: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods,

Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space Applications.

TEXT BOOKS:

1) Text Book of Nano Science and Nano Technology – B.S. Murthy, P. Shankar, Baldev Raj, B.B. Rath and James Munday, University Press-IIM.
2) Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
3) Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press 2004.

REFERENCES BOOKS:

1. Nano: The Essentials by T. Pradeep, McGraw- Hill Education.
2. Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek.
3. Transport in Nano structures- David Ferry, Cambridge University press 2000
4. Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. ChallaS.,S. R. Kumar, J. H. Carola.
5. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
6. Electron Transport in Mesoscopic systems – S. Dutta, Cambridge University press.
7. Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd 1996.

Course Outcomes:

1. Upon completion of course, students will familiarize about Nano Technology.
2. Students should demonstrate the preparation of Nano Technology.
3. Upon course completion, students will develop knowledge in characteristic Nano Technology & Nano Materials.
4. Student should able toexplain about carbon nanotube metal oxide formation.
5. Student able to understand different properties along with sizes.

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	L	T/P/D	C
III Year B. Tech ME - I Sem	**0**	**3**	**1.5**

(R18A0385) THERMAL ENGINEERING& ENERGY RESOURCESLAB

Course Objectives:

1. To study procedure to draw the valve and port timing diagram of CI/SI engines.
2. To understand the performance characteristics of IC engines (both SI and CI engines) in terms of heat balancing, economical speed variations, air fuel ratio influence on the engine.
3. To demonstrate and understand Morse test on multi cylinder SI engine
4. To understand working and performance of reciprocating air compressor
5. To Study design and working of the different types of boilers

LIST OF EXPERIMENTS

1. I.C. Engine Valve / Port Timing Diagrams
2. I.C. Engine Performance Test for 4 Stroke SI engines
3. I.C. Engine Performance Test for 2 Stroke SI engines
4. I.C. Engine Morse/ Retardation/ Motoring Tests
5. I.C. Engine Heat Balance - CI/SI Engines
6. I.C. Engine Economical speed Test on a SI engine
7. I.C. Engine Effect of A/F Ratio in a SI engine
8. Performance Test on Variable Compression Ratio of IC Engine
9. IC Engine Performance Test on a 4S CI Engine at constant speed
10. Volumetric efficiency of Air - Compressor Unit
11. Disassembly / Assembly of Engines
12. Study of Boilers
13. To Study the V-I Characteristics of Solar Panel
14. To Study the Performance Of Solar Flat Plate Collector
15. To Study the Performance Of Evacuated Tube Collector

Note: Total 10 experiments are to be conducted.

Course Outcomes:

1. Draw the valve and port timing diagram of SI engine & CI engine.
2. Calculate & Compare the performance characteristics of diesel and petrol engines.
3. Apply the concept of Morse test on multi cylinder SI engine.
4. Analyze the efficiency of reciprocating air compressor.
5. Understand the working of boilers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
III Year B. Tech, ME-I Sem	**0**	**3**	**1.5**

(R18A0386) MANUFACTURING TECHNOLOGY LAB

Course Objectives:

1. To learn the Step turning and taper turning and thread cutting on lathe machine
2. Practical exposure on Flat Surface machining, Shaping, Slotting, Milling, drilling and grinding operations.
3. Student able to learn about Mechanical parameter measuring systems.
4. Student able to learn about different alignment techniques.
5. To learn the measurement of the Angle and taper s by Bevel protractor, Sine bar,etc.

PART A: MACHINE TOOLS

1. To perform various lathe operations such as plain turning, stepturning, taper turning knurling and chamfering on a givenmaterial made of mild steel.
2. To perform milling operation on the given specimen to accurate dimensions.
3. To perform v and dovetail machining & u-cut on the given workpiece on shaping machine.
4. To perform drilling, counter drilling, boring, counter sinking and tapping operations on drilling machine.
5. To perform cylindrical&surface grinding operations for the given specimen.
6. To make a slot on the given aluminum work piece by slotting machine.

PART B: METROLOGY

1. To measure bore diameters by internal micrometers and dial bore indicators.
2. Measure the addendum and dedendum of the gear tooth using gear tooth vernier calip
3. To measure the pitch length and pitch angle using Tool maker's microscope.
4. To measure the angle and taper measurements by Bevel protractor and Sine bar.
5. To find the flatness of surface plate using spirit level.
6. To perform Thread measurement by Two wire/ Three wire method.

Note: Total 10 Experiments are to be conducted

Course Outcomes:

1. Demonstrate the working principle and parts of different machine tools used in machine shop.
2. Inspect machine tools whether properly aligned or not.
3. Create stepped surface using shaper and keyways using milling machine, perform different turning operations.
4. Apply the procedures to measure length, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments.
5. Measure effective diameter of thread profile using different methods.

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	L	T/P/D	C
III Year B. Tech, ME-I Sem	**2**	**0**	**0**

(R18A0007) CONSTITUTION OF INDIA

Introduction

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

Course Objectives:

1. To enable the students to understand the constitution's origin and its power.
2. To enable the students to analyze the political principles.
3. To enable the students to be aware of their fundamental rights and duties.
4. Student able to learn about federal structure Parliamentary form of Governments.
5. Student able know about historical perspectives of the constitutional amendments in India.

UNIT –I

Meaning of constitution law and constitutionalism
Historical perspective of the constitution of India
Salient features and characteristics of the constitution of India

UNIT –II

Scheme of fundamental rights
The scheme of the fundamental duties and its legal status
The Directive Principles of State Policy- its importance and implementation

UNIT –III

Federal structure and distribution of legislative and financial powers between the Union and the States
Parliamentary Form of Government in India-the constitution powers and status of the president of India
Amendment of the Constitutional Powers and Procedure

UNIT –IV

The historical perspectives of the constitutional amendments in India.
Emergency provisions: National Emergency, President Rule, Financial Emergency
Local self government-Constitutional scheme in India

UNIT –V

Scheme of fundamental Right to Equality

Scheme of fundamental Right to certain Freedom under Article 19
Scope of the Right to Life and Personal Liberty under Article 21

Course Outcomes:

1. Improve their knowledge about Indian constitution..
2. Value their identity and exercise their fundamental rights.
3. Understand how differently government bodies function.
4. Students can explain about federal structure of governance.
5. Student to understand the historical perspectivesEmergency provisions: Local self-government.

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III Year B. Tech ME - II Sem

L	P	C
3	1	3

(R18A0318) HEAT TRANSFER

***Note:** Heat and Mass Transfer data books are permitted

Course Objectives:

1. Student can able to learn about modes of heat transfer and conduction heat transfer
2. Solve lumped and Heisler charts parameter transient heat transfer problems
3. Student can learn types of convection and dimensional analysis.
4. Student can learn phases of heat transfer, heat exchanger performance
5. Student able to learn different laws of Radiation and its applications.

UNIT-I

Introduction: Basic modes of heat transfer- Rate equations – Differential heat conduction equation in Cartesian, Cylindrical and Spherical coordinate systems. Steady state one dimensional heat conduction solutions for plain and composite slabs, cylinders and spheres, electrical resistance concept - Critical thickness of insulation- Heat conduction through fins of uniform and variable cross section- Fin effectiveness and efficiency.

UNIT-II

Unsteady state Heat Transfer conduction: I-D Transient heat conduction- Lumped system analysis, and solutions by use of Heisler charts.

UNIT-III

Convection: Dimensional analysis- Continuity, momentum and energy equations - Boundary layer theory concept- Free, and Forced convection- Approximate solution of the boundary layer equations - Laminar and turbulent heat transfer correlation- Application of dimensional analysis to free and forced convection problems- Dimensionless numbers and Empirical correlations.

UNIT-IV

Heat Exchangers: Types of heat exchangers- Parallel flow- Counter flow- Cross flow heat exchangers- Overall heat transfer coefficient- LMTD and NTU methods- Fouling factor - Heat exchangers with phase change.

Boiling and Condensation: Different regimes of boiling- Nucleate, Transition and Film boiling. Condensation: Laminar film condensation-Empirical relations, Nusselt's theory- Condensation on vertical flat plate and horizontal tubes- Drop wise condensation.

UNIT- V

Radiation: Black body radiation- radiation field, Kirchhoff’s laws- shape factor- Stefan Boltzman equation- Heat radiation through absorbing media- Radiant heat exchange, parallel and perpendicular surfaces - Radiation shields.

TEXT BOOKS:

1. Heat Transfer, by J.P.Holman, Int.Student edition, McGraw Hill Book Company.
2. Fundamentals of Heat and Mass Transfer- Sachdeva, New Age Publications

REFERENCE BOOKS:

1. Heat Transfer by S.P.Sukhatme.
2. Heat transfer by YunusACengel.
3. Heat transfer by Arora and Domakundwar, Dhanpat Rai & sons, New Delhi

Course Outcomes:

1. To identify the modes of heat transfer and calculate the conduction in various solids.
2. Calculate unsteady state heat conduction problems applied to different geometries.
3. To solve the heat convection in various medium.
4. To evaluate the heat transfer in phase change process, design heat exchange equipment based on the need that fit to application.
5. To learn about the radiation and its use in real life

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	L	T/P/D	C
III Year B. Tech, ME-II Sem	**3**	**0**	**3**

(R18A0319) COMPUTER AIDED DESIGN

Course Objectives:

1. To provide an overview of how computers are being used in design, development of manufacturing plans and manufacture
2. Understandthe Mathematical representations of curves and surfaces used in geometric construction.
3. Understandthe Mathematical representations of solids used in geometric construction.
4. Understand the transformation of 2D and 3D parts
5. Understand the algorithm for visualization of various 2D and 3D parts

UNIT–I

Introduction: Computers in Industrial Manufacturing, Product cycle, CAD / CAM Hardware, Basic structure.

Computer Graphics: Refresh display, DVST, Raster display, pixel value and lookup table, estimation of graphical memory, LCD, LED fundamentals. Concept of Coordinate Systems: Working Coordinate System, Model Coordinate System, Screen Coordinate System. Line and Curve generation algorithm: DDA, Bresenham's algorithms. Graphics exchange standards and Database management systems.

UNIT–II

Curves and Surfaces: Parametric representation of lines: Locating a point on a line, parallel lines, perpendicular lines, distance of a point, Intersection of lines. Parametric representation of circle, Ellipse, parabola and hyperbola. Synthetic Curves: Concept of continuity, Cubic Spline: equation, properties and blending. Bezier Curve: equations, properties; Properties and advantages of B-Splines and NURBS. Various types of surfaces along with their typical applications.

UNIT–III

Mathematical representation of solids: Geometry and Topology, Comparison of wireframe, surface and solid models, Properties of solid model, properties of representation schemes, Concept of Half-spaces, Boolean operations. Schemes: B-rep, CSG, Sweep representation, ASM, Primitive instancing, Cell Decomposition and Octree encoding

UNIT–IV

Geometric Transformations: Homogeneous representation; Translation, Scaling, Reflection, Rotation, Shearing in 2D and 3D; Orthographic and perspective projections. Window to View-port transformation.

UNIT–V

VISUAL REALISM: Hidden – Line-Surface-Solid removal algorithms – shading – colouring – computer animation.

TEXT BOOKS:

1. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH Publishers
2. CAD / CAM /A Zimmers&P.Groover/PE/PHI Publishers

REFERENCE BOOKS:

1. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age Publishers
2. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson Edu
3. CAD/CAM: Concepts and Applications/Alavala/ PHI Publishers Computer Numerical Control Concepts and programming / Warren S Seames / Thomson Publishers

4. CAD / CAM – P N RAO McGraw Hill Publications

Course Outcomes:

1. Understand the applications of computer in the design and manufacturing.
2. Understand and develop the Mathematical representations of curves used in geometric construction.
3. Understand and develop the Mathematical representations of solids used in geometric construction.
4. Able to get the transformed in 2D and 3D using transformation equations
5. Understand and develop the algorithm for visualization of various 2D and 3D parts

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L	T/P/D	C
3	0	3

(R18A0320) MACHINE DESIGN–II

NOTE: Design Data Book is permitted. Design of all components should include design for strength and rigidity apart from engineering performancerequirements.

Course objectives:

1. To apply principles of design to mechanical power transmission elements like bearings and to design appropriate bearing
2. To design the engine parts like piston, connecting rod and analyze design procedure different loading conditions
3. To introduce the concept, procedures, and data to analyze machine elements in power transmission systems.
4. To apply principles of design and Analyze the forces in mechanical power transmission elements such gears
5. Implement basic principles for the design of power screws And the forces, couples, torques etc,

UNIT–I

BEARINGS: Types of Journal bearings – Lubrication – Bearing Modulus – Full and partial bearings –Clearance ratio – Heat dissipation of bearings, bearing materials – journal bearing design – Ball and roller bearings – Static loading of ball & roller bearings, Bearing life.

UNIT–II

ENGINE PARTS: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – Pistons, Forces acting on piston – Construction, Design and proportions of piston.

UNIT–III

POWER TRANSIMISSION SYSTEMS AND PULLEYS : Transmission of power by Belt and Rope drives, Transmission efficiencies, Belts – Flat and V types .

MECHANICAL SPRINGS: Stresses and deflections of helical springs – Extension and compression springs – Design of springs for fatigue loading – natural frequency of helical springs – Energy storage capacity – helical torsion springs .

UNIT–IV

GEARS: Spur gears & Helical gears- important Design parameters – Design of gears using AGMA procedure involving Lewis and Buckingham equations. Check forwear.

UNIT–V

DESIGN OF POWER SCREWS: Design of screw, Square ACME , Buttress screws, compound screw, differential screw.

TEXT BOOKS :

1. Machine Design byR.S.Khurmi and J.K.Gupta, S.ChandPublishers,New Delhi.
2. Machine Design, S MD Jalaludin, Anuradha Publishers.
3. Design of Machine Elements by V. Bhandari TMH

REFERENCE BOOKS:

1. Machine Design Data Book by S MD Jalaludin, Anuradha Publishers
2. Machine Design Data Book by P.S.G. College of Technology
3. Machine Design by Pandya and Shah, Chortar Publications.
4. Machine Design / R.N. Norton
5. Mechanical Engineering Design / JE Shigley.

Course Outcomes:

Studentwillbeableto:

1. To gain the knowledge on bearings and Select suitable bearings and its constituents from manufacturers catalogues under given loading conditions
2. Calculate the design parameter for energy storage element and engine components, connecting rod and piston
3. To understand the types belt drives and Select suitable belt drives and associated elements from manufacturers catalogues under given loading conditions to design the springs for different loading conditions
4. Select appropriate gears for power transmission on the basis of given load and speed Design gears based on the given conditions Apply the design concepts to estimate the strength of the gear
5. Analyze power screws subjected to loading

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(R18A0321)SMART MANUFACTURING TECHNOLOGIES
(PROFESSIONAL ELECTIVE 2)

Course Objectives:

1. This course introduces the concepts of Industrial Internet of Things, and Cloud Computing.
2. The objective of this course is to learn the statistics and optimization methodologies in smart manufacturing systems.
3. The students will know how to apply artificial intelligence (AI) and data mining (DM) techniques to solve the real problems in shop-floor level or capacity planning problems.
4. Evaluation criteria and industry benchmarks for determining where and how smart manufacturing processes can benefit your organization.
5. Detailed understanding of how sensors, automation and data science are transforming individual processes and improving operational performance throughout the manufacturing enterprise.

UNIT I:

Computer Integrated Manufacturing Systems Structure and functional areas of CIM system, - CAD, CAPP, CAM, CAQC, ASRS. Advantages of CIM. Manufacturing Communication Systems - MAP/TOP, OSI Model, Data Redundancy, Top- down and Bottom-up Approach, Volume of Information. Intelligent Manufacturing System Components, System Architecture and Data Flow, System Operation.

UNIT II

Components of Knowledge Based Systems - Basic Components of Knowledge Based Systems, Knowledge Representation, Comparison of Knowledge Representation Schemes, Interference Engine, Knowledge Acquisition.

UNIT III

Machine Learning - Concept of Artificial Intelligence, Conceptual Learning, Artificial Neural Networks-Biological Neuron, Artificial Neuron, Types of Neural Networks, Applications in Manufacturing.

UNIT IV

Automated Process Planning - Variant Approach, Generative Approach, Expert Systems for Process Planning, Feature Recognition, Phases of Process planning. Knowledge Based System for Equipment Selection (KBSES) - Manufacturing system design. Equipment Selection Problem, Modeling the Manufacturing Equipment Selection Problem, Problem Solving approach in KBSES, Structure of the KRSES.

UNIT V

Group Technology: Models and Algorithms Visual Method, Coding Method, Cluster Analysis Method, Matrix Formation - Similarity Coefficient Method, Sorting-based Algorithms, Bond

Energy Algorithm, Cost Based method, Cluster Identification Method, Extended CI Method. Knowledge Based Group Technology - Group Technology in Automated Manufacturing System. Structure of Knowledge based system for group technology (KBSCIT) — Data Base, Knowledge Base, Clustering Algorithm.

TEXT BOOKS:

1. Intelligent Manufacturing Systems/ Andrew Kusiak/Prentice Hall.
2. Artificial Neural Networks/ Yagna Narayana/PHI/2006
3. Automation, Production Systems and CIM/Groover M.P./PHI/2007

REFERENCE BOOKS:

1. Neural networks: A comprehensive foundation/ Simon Hhaykin/ PHI.
2. Artificial neural networks/ B.Vegnanarayana/PHI
3. Neural networks in Computer intelligence/ Li Min Fu/ TMH/2003
4. Neural networks/ James A Freeman David M S kapura/ Pearson education/2004
5. Introduction to Artificial Neural Systems/Jacek M. Zurada/JAICO Publishing House Ed. 2006.

Course outcomes:

1. Students should be able to understand basic concepts of computer integrated manufacturing.
2. Students should be able to understand basic Components of Knowledge Based Systems.
3. Understand the Concept of Artificial Intelligence.
4. Students should be able to understandAutomated Process Planning.
5. Students should be able to understand about grouping the parts.

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III Year B. Tech, ME-II Sem

(R18A0322) COMPUTATIONAL FLUID DYNAMICS
(PROFESSIONAL ELECTIVE 2)

Course Objectives:

To enable the students to

1. Provide with sufficient background to understand the mathematical representation of the governing equations of fluid flow and heat transfer.
2. Solve one and two-dimensional ordinary and partial differential equations using traditional CFD tools.
3. Understand the various discretization techniques.
4. Understand the turbulence models and grid generation techniques.
5. How to apply explicit, implicit and semi-implicit methods of finite differencing.
6. To help the students solve fluid flow field using some popular CFD techniques

UNIT-I

Governing Equations of fluid flow and Levels of approximation: Basics of computational fluid dynamics – Continuity equation, Navier-Stokes equation and various flow conditions, Chemical species transport and Physical boundary conditions – Turbulent Flow – Turbulent modeling – inviscid flow and Boundary layer approximations. Mathematicalbehavior of PDEs on CFD – Elliptic, Parabolic and Hyperbolic equations.

UNIT-II

Fundamentals of discretisation and Properties of Numerical Schemes:

Converting derivatives intoDiscrete Expressions – Spatial Discretisation. Discretisation methods- Finite difference method, Finite Element Method, Boundary value problems, Finite Volume method and Temporal Discretisation. The accuracy of Discretisation process and an illustrative example.

Properties of Numerical Schemes: Basic Definitions-Consistency, stability and convergence

UNIT-III

Finite Difference Method and Finite Element Method:

FDM**:** Basics of Forward, backward and central difference schemes with an example in fluid flow and heat transfer. Multi-dimensional finite difference formulae. Uniform and non uniform meshes.

FEM: Variational principles, weighted integral formulation, Functional, Rayleigh Ritz, Galerkin Concepts and Boundary conditions. Elements and shape functions in one, two and three dimensions. Discrete equations and assembly and solutions.

UNIT-IV

Finite Volume Method and solution methods of System of Equations:

The Diffusion Equation- Stokes equation, Finite volume Discretization, application of boundary condition. The convection diffusion equation, Upwind scheme. Extension to multi-

dimensional problem. Unstructured grids. SIMPLE algorithm.

Linear and Nonlinear systems – Gauss elimination method, Newton method, and Quasi Newton Method. Iterative methods and multi grid acceleration.

UNIT-V

Turbulence Models and Mesh Generation: Turbulence models, mixing length model, Two equation (k-Є) models – High and low Reynolds number models – Structured Grid generation – Unstructured Grid generation – Mesh refinement – Adaptive mesh – Software tools.

TEXT BOOKS:

1. H.K.Versteeg& W. Malalasekera, An Introduction to Computational Fluid Dynamics, Longman Scientific & Technical.
2. Patankar, S.V. Numerical Heat Transfer and Fluid Flow, Hemisphere Publishing Corporation,2004.

REFERENCE BOOKS:

1. J.D. Anderson, Jr., (2000), Computational Fluid Dynamics – The basics with applications, McGraw-Hill.
2. Muralidhar, K., and Sundararajan, T.,Computational Fluid Flow and HeatTransfer, Narosa Publishing House, New Delhi, 1995.
3. Prodip Niyogi, Chakrabarty, S.K., Laha, M.K. Introduction to Computational Fluid Dynamics, Pearson Education, 2005.

Course Outcomes:

1. Demonstrate & explain geometrical model of a fluid flow.
2. Describe specific boundary conditions and solution parameters.
3. Analyze the results and draw the appropriate inferences.
4. Solve fluid flow fields using CFD methods
5. Model fluid flow problems and heat transfer.

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III Year B. Tech, ME-II Sem

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3	0	3

(R18A0323) TOOL DESIGN

(PROFESSIONAL ELECTIVE 2)

Course Objectives:

1. To understand the functions and design principles of Jigs, fixtures and press tools.
2. To gain proficiency in the development of required views of the final design.
3. To gain the knowledge on Press Working Terminologies And Elements Of Cutting Dies.
4. To explain between bending and drawing.
5. To know about different types of the forming techniques.

UNIT I

LOCATING AND CLAMPING PRINCIPLES:

Objectives of tool design- Function and advantages of Jigs and fixtures – Basic elements – principles of location – Locating methods and devices – Redundant Location – Principles of clamping – Mechanical actuation – pneumatic and hydraulic actuation Standard parts – Drill bushes and Jig buttons – Tolerances and materials used.

UNIT II

JIGS AND FIXTURES

Design and development of jigs and fixtures for given component- Types of Jigs – Post, Turnover, Channel, latch, box, pot, angular post jigs – Indexing jigs – General principles of milling, Lathe, boring, broaching and grinding fixtures – Assembly, Inspection and Welding fixtures – Modular fixturing systems- Quick change fixtures.

UNIT III

PRESS WORKING TERMINOLOGIES AND ELEMENTS OF CUTTING DIES

Press Working Terminologies – operations – Types of presses – press accessories – Computation of press capacity – Strip layout – Material Utilization – Shearing action – Clearances – Press Work Materials – Center of pressure- Design of various elements of dies – Die Block – Punch holder, Die set, guide plates – Stops – Strippers – Pilots – Selection of Standard parts – Design and preparation of four standard views of simple blanking, piercing, compound and progressive dies.

UNIT IV

BENDING AND DRAWING DIES

Difference between bending and drawing – Blank development for above operations – Types of Bending dies – Press capacity – Spring back – knockouts – direct and indirect – pressure pads – Ejectors – Variables affecting Metal flow in drawing operations – draw die inserts – draw beads- ironing – Design and development of bending, forming, drawing,

reverse redrawing and combination dies – Blank development for axisymmetric, rectangular and elliptic parts – Single and double action dies.

UNIT V

OTHER FORMING TECHNIQUES

Bulging, Swaging, Embossing, coining, curling, hole flanging, shaving and sizing, assembly, fine Blanking dies – recent trends in tool design- computer Aids for sheet metal forming Analysis – basic introduction – tooling for numerically controlled machines- setup reduction for work holding – Single minute exchange of dies – Poka Yoke.

TEXT BOOKS:

- Joshi, P.H. "Jigs and Fixtures", Second Edition, Tata McGraw Hill Publishing Co., Ltd., New Delhi, 2004.
- Joshi P.H "Press tools – Design and Construction", wheels publishing, 1996

REFERENCES:

- Venkataraman. K., "Design of Jigs Fixtures & Press Tools", Tata McGraw Hill, New Delhi, 2005.
- Donaldson, Lecain and Goold "Tool Design", 3rd Edition, Tata McGraw Hill, 2000.
- Kempster, "Jigs and Fixture Design", Third Edition, Hoddes and Stoughton, 1974.
- Hoffman "Jigs and Fixture Design", Thomson Delmar Learning, Singapore, 2004.
- ASTME Fundamentals of Tool Design Prentice Hall of India.
- Design Data Hand Book, PSG College of Technology, Coimbatore.

Course Outcomes:

1. Upon completion of this course, the students can able to design jigs, fixtures and press tools.
2. Students can able to follow the general principles to design jigs, fixtures and press tools.
3. Students can understand the terminology and elements of cutting dies.
4. Student can Differentiate between bending and drawing.
5. Student can explain about all other forms forming techniques.

OPEN ELECTIVES III

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	3	-/-/-	3

(R18A0455) EMBEDDED SYSTEMS

(OPEN ELECTIVE III)

Course Objectives:

1. To understand the basics of microprocessors and microcontrollers architecture and its functionalities
2. Understand the core of an embedded system
3. To learn the design process of embedded system applications.
4. To understands the RTOS and inter-process communication.
5. Able to learn how to apply explicit, implicit and semi-implicit methods of finite differencing.

UNIT-I

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS: 8086 Microprocessor: Architecture of 8086, Register Organization, Programming Model, Memory Segmentation, Signal descriptions of 8086, Addressing modes, Instruction Set.

8051 Microcontroller: 8051 Architecture, I/O Ports, Memory Organization, Instruction set of 8051, memory interfacing to 8051.

UNIT-II

INTRODUCTION TO EMBEDDED SYSTEMS:

History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, Applications of embedded systems, and characteristics of embedded systems, Operational and Non-operational attributes of embedded systems.

UNIT-III

TYPICAL EMBEDDED SYSTEM

Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTs; Memory-ROM, RAM, memory selection for embedded systems; Sensors and actuators , Onboard communication interfaces-I2C, SPI. External communication interfaces: RS232, WIFI.

UNIT-IV

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT-V

RTOS BASED EMBEDDED SYSTEM DESIGN

Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling; Device drivers, How to choose an RTOS.

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., Cengage Learning
3. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, TMH, 2nd Edition 2006
2. Embedded Systems- An integrated approach - Lyla B Das, Pearson education 2012.

Course Outcomes:

1. The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. Understand and design the Embedded systems
3. Understand Embedded Firmware design approaches
4. Learn the basics of RTOS.
5. Model fluid flow problems and heat transfer.

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III Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A0454) INTERNET OF THINGS & APPLICATIONS

(OPEN ELECTIVE III)

Course Objectives:

1. To study IoT Networking Core
2. To study IoT related network fundamentals
3. To study IoT Architecture.
4. To study IoT Application Development procedure
5. To study various case studies and IoT applications.

UNIT I

The IoT Networking Core :

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

UNIT II

Network Fundamentals:

Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's – Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.

UNIT III

IoT Architecture:

History of IoT, M2M – Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, Performance Analysis. The Architecture The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

UNIT IV

IoT Application Development:

Application Protocols MQTT, REST/HTTP, CoAP, MySQL.

Back-end Application Designing

Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools

UNIT V

Case Study & IoT Applications:

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach) , Vijay Madisetti , ArshdeepBahga
3. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, “Mobile Computing,” Tata McGraw Hill, 2010.
5. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
6. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition

Course Outcomes:

1. Understand IoT Networking Core
2. Understand IoT related network fundamentals
3. Understand IoT Architecture.
4. Understand IoT Application Development procedure
5. Understand various case studies and IoT applications.

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3	-/-/-	3

(R18A1251) SOFTWARE TESTING

(OPEN ELECTIVE - III)

Course Objectives:

1. Knowing the concepts of Software Engineering and software development life cycle.
2. Understanding the foundations, techniques, and tools in the area of software testing and its practice in the industry.
3. Learning the functional aspect of the various testing techniques.
4. Knowledge of the creation of test cases and usage of testing tools.
5. Learning about different testing types in software testing.

UNIT – I **INTRODUCTION**

Software, Software Engineering, Process Models: Waterfall Model, Spiral Model, Prototyping, V Model. Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester – Independent Verification and Validation.

UNIT - II **SOFTWARE TESTING REQUIREMENTS**

Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews: Peer Review – Walkthrough - Inspection - Checklists of Review Process - Review Log.

UNIT - III **TESTING TECHNIQUES**

White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision/Branch Coverage – Basic Path Testing – Control Flow Graph Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques: Boundary Value Analysis – Equivalent Class Partition – Cause-Effect Analysis – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.

UNIT - IV **TESTING TYPES**

Unit Testing, Functional Testing: Smoke Testing – Integration, System Testing, User Acceptance Testing - Non Functional Testing:– Performance Testing – Recovery Testing – Security Testing – Compatibility Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - Data ware House Testing and Business Intelligence Testing – SOA Testing - Mobile Testing.

UNIT - V **TEST CASE DESIGN**

Definition of Test Case - Standards, Guidelines and Naming Conventions – Characteristics of Good Test Cases – Test Case templates – Creation of Test Case – Requirement Coverage –Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting of Test Execution – Definition of Risk - Risk Based Testing Approach.

Overview of Testing Tools like Winrunner, Loadrunner, Selenium, JMeter.

TEXT BOOKS :

1. Software Testing Techniques – BorisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
3. S.Subashni, N.Satheesh Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, ”Software Testing”, Umayam Publications , First edition, 2013.

REFERENCE BOOKS:

1. Srinivasan Desikan, GopalaswamyRamesh,”Software Testing: Principles and Practice”, Pearson Education India, First Impression 2006.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing Concepts and Tools:P.NageshwarRao, dreamtechPress.
4. Art of Software Testing – Meyers, John Wiley.
5. Software Testing in the Real World – Edward Kit, Pearson.

Course Outcomes:

1. Analyze the strategies for software testing.
2. Identify the issues in test management and testing activity.
3. Apply the suitable testing strategy for a given application.
4. Development of test cases and selection of appropriate testing tool.
5. Identify the suitable testing techniques in software testing.

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III Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A0355) TOTAL QUALITY MANAGEMENT

(OPEN ELECTIVE III)

Course Objectives:

1. To facilitate the understanding of Quality Management principles and process.
2. To understand Customer focus, Employee focus and their involvement and Supplier Management.
3. Student able to know about Organizing for TQM.
4. To gain the knowledge on The Cost of Quality
5. To gain the knowledge on all Universal Standards of Quality..

UNIT – I

Introduction, The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

Customer Focus and Satisfaction: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner &Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q-90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOK:

1. Total Quality Management / Joel E. Ross/Taylor and Franscis Limited
2. Total Quality Management/P. N. Mukherjee/PHI

REFERENCE BOOKS:

1. Beyond TQM / Robert L.Flood
2. Total quality management by Paneer Selvam
3. Statistical Quality Control / E.L. Grant.
4. Total Quality Management:A Practical Approach/H. Lal
5. Quality Management/Kanishka Bedi/Oxford University Press/2011
6. Total Engineering Quality Management/Sunil Sharma/Macmillan

Course Outcomes:

1. The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
2. To give the students an overview of TQM, various Quality aspects and.
3. Student can able to manage industrial quality organizing for TQM.
4. To give importance of Top Management Commitment in any organization for maintaining product / services quality.
5. To give suitable standards of quality for TQM.

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	3	-/-/-	3

(R18A0551)MANAGEMENT INFORMATION SYSTEMS

OPEN ELECTIVE III

Course Objective:

1. To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
2. To learn how to plan for information systems &implementation.
3. To learn about Management of IS: Information system planning.
4. To understand Building of Information Systems Structured Analysis Tools, System Design.
5. To study about security aspects of information systems.

UNIT-I

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

UNIT-II

Business Applications of Information Systems : E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

UNIT-IV

Building of Information Systems: System Development Stages, System Development Approaches.

Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.

Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V

Introduction to Cyber Crime : Cyber Crime Defination and orgin of the word,cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and indian ITA 2000,Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOK

D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCES:

1. Nina Godbole &SunitBelapure“ Cyber Security” Wiley india 2012.
2. Jawadekar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka “Cases in Management Information system ‘Everest, 2012.
4. A K Gupta, Sharma “Management of Systems” Macmillan, 2012.
5. Sandra Senf “Information Technology Control and Audit” 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP - https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) - https://magento.com/
8. Adempiere – ERP :http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS - http://www.lumina.com
10. OpenRules – Business Rules and Decision Management system - http://openrules.com/

Course Outcome:

1. Ability to apply Concepts & applications of Management Information Systems.
2. Ability to perform Information Systems Planning & Implementations.
3. Able to explain Information system planning.
4. Ability to adapt Building of Information Systems Structured Analysis Tools, System Design.
5. Ability to adapt Cyber-crime and information security procedures.

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III Year B.Tech. II Sem	L	T/P/D	C
	3	-/-/-	3

(R18A1253)OPERATING SYSTEM CONCEPTS

OPEN ELECTIVE III

Course Objectives:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication
3. To learn the mechanisms involved in memory management in contemporary OS
4. Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management

Unit I:

Introduction, objectives and functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, OS services, system calls, system programs, virtual machines.

Unit-II:

Process Management:

Process concept, Process states, threads, **CPU Scheduling** - Scheduling algorithms, multiple processors and real time scheduling. **Process synchronization** – Critical section problems, Peterson's Solution, semaphores, monitors.

Unit-III:

Memory Management:

Basic concept, Logical and Physical addresses, contiguous memory allocation, swapping, paging, segmentation. **Virtual memory** – Basics of Virtual Memory, Demand Paging, Page Replacement algorithms, allocation of frames, thrashing.

Unit-IV: **File Management**: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), Case study: UNIX, Windows.

Unit-V:

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk attachment, disk management.

Dead locks: Characterization, Dead lock Prevention, Dead lock Avoidance, Dead lock Detection and Recovery.

Text Book:

1. Operating Systems Concepts –AvilSilberschatz j, Peter Galvin, GreyGagne

Reference:

1. Modern Operating Systems –Andrew S. Tanenbaum, PHI
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India

Course Outcomes:

At the end of the course the students are able to:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

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III Year B. Tech ME - II Sem

L	P	C
0	3	1.5

(R18A0387) COMPUTER AIDED DESIGN AND MANUFACTURING LAB

Course Objectives

1. To analyse the various mechanical components
2. To impart the students with necessary computer aided modeling skills using standard CADpackages.
3. To expose the students to the techniques of CNC programming and cutting tool path generation through CNC simulation software by using G-Codes and M-codes and writing part program for simple machine parts.
4. Simulation of mechanical components by visualization softwares
5. To know the procees plan creation in design and manufacturing

LIST OF EXPERIMENTS:

1) Determination of deflection and stresses in 2D and 3D trusses and beams.
2) Determination of deflections component and principal and Von-mises stresses in .plane stress, plane strain and Axisymmetric components.
3) Determination of stresses in 3D and shell structures (at least one example in each . case)
4) Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
5) Steady state heat transfer Analysis of plane and Axisymmetric components.
6) Development of process sheets for various components based on tooling Machines.
7) Development of manufacturing and tool management systems.
8) Study of various post processors used in NC Machines.
9) Development of NC code for free form and sculptured surfaces using CAM packages.
10) Machining of simple components on NC lathe by transferring NC Code / from a CAM package.
11) Simulation of Piston and connecting rod assembly
12) Simulation of pillow block bearing assembly
13) Simulation of pumps

Note: Total 10 experiments are to be conducted.

Any Three Software Packages from the following:

Use of Auto CAD, Micro Station, CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM,Master CAM , visualization softwares,MAT LAB, NASTRON, HYPERMESH, PATRAN etc.

Course Outcomes:

1. Understand the various types analysis in Ansys.
2. Understand the geometric modeling to represent curves and surfaces.
3. Understand the basic geometric commands and numerical control.
4. Able to do the Simulation of mechanical components by visualization softwares
5. Understand the concept of process plan in design and manufacturing

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech ME - II Sem

L	P	C
0	3	1.5

(R18A0388) HEAT TRANSFER LAB

Course Objectives :

1. The primary objective of this course is to provide the fundamental knowledgenecessary
2. To understand the behavior of thermal systems.
3. This course provides a detailedexperimental analysis,
4. Including the application and heat transfer through solids, fluids, and vacuum.
5. Convection, conduction, and radiation heat transfer in one and two dimensional steadyand unsteady systems are examined

LIST OF EXPERIMENTS:

1. Composite Slab Apparatus – Overall heat transfer co-efficient.
2. Heat transfer through lagged pipe.
3. Heat Transfer through a Concentric Sphere
4. Thermal Conductivity of given metal rod.
5. Heat transfer in pin-fin.
6. Experiment on Transient Heat conduction.
7. Heat transfer in forced convection apparatus.
8. Heat transfer in natural convection.
9. Parallel and counter flow heat exchanger.
10. Emissive apparatus.
11. Stefan Boltzman Apparatus.
12. Critical Heat flux apparatus.
13. Study of heat pipe and its demonstration.

Note: Total 10 experiments are to be conducted.

Course Outcomes:

1. Perform experiments to determine the thermal conductivity of a metal rod.
2. Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.
3. Estimate the effective thermal resistance in composite slabs
4. Determine surface emissivity of a test plate
5. Estimate performance of effectiveness of fin
6. Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach

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IV Year B. Tech, ME-II Sem

L	T/P/D	C
0	6	3

(R18A0394) MINI PROJECT (SUMMER INTERNSHIP)

COURSE OBJECTIVES:

1. To acquaint with the process of undertaking literature survey/industrial visit and identifying the problem
2. To familiarize the process of solving the problem in a group
3. To acquaint with the process of applying basic engineering fundamental in the domain of practical applications
4. To inculcate the process of research
5. To work with group and share responsibilities.

COURSE OUTCOMES:

1. Identify a topic in advanced areas of Mechanical Engineering.
2. Review literature to identify gaps and define objectives & scope of the work
3. Generate and implement innovative ideas for social benefit.
4. Develop conceptual design and methodology of solution for the problem.
5. Learn team work and share responsibility.

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L	T/P/D	C
2	-/-/-	-

III Year B.Tech. II Sem

(R18A0006) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

Course Objectives:

1. To make the students recognize the role of Technical English in their academic and professional fields.
2. To improve language proficiency and develop the required professional skills.
3. To equip students with tools to organize, comprehend, draft short and long forms of technical work.
4. Able to learn effective writing editing strategies to achieve appropriate technical style.
5. Able to learn group discussion, interviews leadership skills & team building personal goal setting and career planning

SYLLABUS

The textbook prescribed for study is a manual that has been compiled by the department of English to meet the academic and professional needs of the students.

UNIT I

Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT II

Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT III

Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT IV

Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT V

Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCES:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

Course Outcomes:

1. The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
2. Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
3. Students will also be able to adhere to ethical norms of scientific communication.
4. Students will be able to strengthen their individual and collaborative work strategies.
5. Students will be able to develop personality development skills.

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L	T/P/D	C
3	0	3

IV Year B. Tech, ME-I Sem

(R18A0324) AUTOMATION AND CONTROL ENGINEERING

Course Objectives:

1. To perform one or more processing operations
2. To understand the need of Mechatronics systems
3. To make students familiar with the constructions and working principle of different types of sensors and transducers.
4. Understand the fundamental concepts of electro mechanics and fluid mechanics (hydraulics and pneumatics) ofActuators and drive systems.
5. To impart knowledge on the control elements
6. To understand the different control schemes generally used to get best output.

UNIT–I

Introduction to automation: Types and strategies of automation, pneumatic and hydraulic components circuits, Mechanical Feeding and machine tool control to transfer the automation.

Introduction to Mechatronics: Role of various engineering disciplines in Mechatronics, Mechatronics design elements, Scope of Mechatronics, Applications of Mechatronics.

UNIT-II

Sensors and Transducers: Sensors and transducers, performance terminology, displacement, position and proximity, velocity and motion, force, fluid pressure, liquid flow, liquid level, temperature, light sensors, selection of sensors.

UNIT-III

Actuators and drive systems: Mechanical, Electrical, Hydraulic drive systems, Characteristics of mechanical, Electrical, Hydraulic and pneumatic actuators and their limitations.

UNIT-IV

Control system components: Introduction, classification of control system- classification of control systems on the basis of control signal used, Adaptive control system, Process control systems

UNIT-V

Process control: Introduction, concept of process control, Automatic controllers- digital controller, Electronic controllers, Pneumatic controllers, P-I controller, PD controller, P-I-D controller, Hydraulic controllers.

TEXT BOOKS:

1. Mechatronics, W.Bolton, Pearson Education, Asia.
2. Mechatronics, M.D. Singh and J.G. Joshi, PHI.

REFERENCE BOOKS:

1. Mechatronics, D.A. Bradley, D. Dawson, N.C. Buru and A.J. Loader, Chapman Hall.
2. Microprocessor Architecture, Programming & Applications, S. Ramesh, Gaonkar, Wiley Eastern.
3. The Mechatronics Handbook with ISA– The Instrumentation, Systems, Automation, Robert H. Bishop. Ed.-in-chief., CRC Press.

Course Outcomes:

1. The importance of automation in industries and Identification of key elements of mechatronics system
2. Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
3. Describe and analyze working principles of various types of motors, differences, characteristics and selection criteria, control methods.
4. understand fundamental elements of drive systems, analyse the steady-state characteristics of a few commonly used types of actuators used in the industry.
5. The students will be able to handle different types of controller like electronic, pneumatic and hydraulic.

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	L	T/P/D	C
IV Year B. Tech, ME-I SEM	**2**	**1**	**3**

(R18A0325) OPERATIONS RESEARCH

Course Objectives:

1. Define and formulate linear programming problems and appreciate their limitations.
2. Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained and translate solutions into directives for action.
3. Conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.
4. Develop mathematical skills to analyze and solve integer programming and network models arising from a wide range of applications.
5. Effectively communicate ideas, explain procedures and interpret results and solutions in simulation.

UNIT–I

Introduction: Development of OR – Definitions-Operation Research models– applications.
Resource Allocation: Linear Programming Problem Formulation –Graphical solution – Simplex method –Artificial variables techniques -Big-M method

UNIT–II

Transportation Problem: Formulation – Optimal solution, unbalanced transportation problem –Degeneracy. **Assignment problem** –Formulation –Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

UNIT–III

Theory of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT–IV

Replacement Analysis: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.**Inventory:** Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed

UNIT–V

Sequencing: Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.
Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Simulation Languages

TEXT BOOKS :

1 S.D.Sharma - Operations Research , Kedarnath, Ramnath 2015
2. Hiller &Libermann - Introduction to O.R , Mc Graw Hill 2011
3. Taha - Introduction to O.R , PHI 2010

REFERENCE BOOKS:

1. A.M.Natarajan,P.Balasubramani,A. Tamilarasi -Operations Research , Pearson . Education.
2. R.Pannerselvam - Operations Research ,PHI Publications 2006
3. J.K.Sharma- Operation Research , MacMilan 2010

Course Outcomes:

1. Student will be able to Identify and develop operational research models from the verbal description of the real system.
2. Understand the mathematical tools that are needed to solve optimization problems.
3. Develop a report that describes the model and the solving technique, analyses the results and propose recommendations in language understandable in Management Engineering.
4. Student able to understand Multi-criteria decision techniques, Decision making under uncertainty and risk, Game theory, and Dynamic programming.
5. Use mathematical software to solve the proposed simulation models.

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IV Year B. Tech, ME-I Sem	L	T/P/D	C
	3	0	3

(R18A0326)MECHANICAL MEASUREMENTS AND INSTRUMENATION

Course Objectives:

1. To study concept of architecture of the measurement system**.**
2. To deliver working principle of mechanical measurement system.
3. To impart knowledge of mathematical modeling of the control system and control system under different time domain**.**
4. To analyze the stress and strain measurements and humidity measurements
5. To understand the Measurement of Force, Torque and Power Elements of Control Systems

UNIT–I

Definition–Basicprinciplesofmeasurement–Measurementsystems,generalizedconfigurationandfunctionaldescriptionsofmeasuringinstruments–examples. Dynamic performance characteristics–sources oferror, Classification and elimination oferror.

MeasurementofDisplacement: Theoryandconstructionofvarioustransducerstomeasuredisplacement–Piezo electric, Inductive, capacitance, resistance, ionizationandPhotoelectric transducers, Calibration procedures.

UNIT–II

MeasurementofTemperature: Classification–Ranges–VariousPrinciplesofmeasurement–Expansion,Electrical Resistance–Thermistor– Thermocouple– Pyrometers–Temperature Indicators.

MeasurementofPressure: Units–classification–differentprinciplesused.Manometers,Piston,Bourdonpressure gauges,Bellows–Diaphragmgauges.Lowpressuremeasurement–Thermalconductivitygauges–ionizationpressure gauges, Mcleodpressuregauge.

MeasurementofLevel: Directmethod–Indirectmethods–capacitative,ultrasonic,magnetic,cryogenicfuellevel indicators –Bublerlevel indicators.

UNIT–III

FlowMeasurement: Rotameter,magnetic,Ultrasonic,Turbineflowmeter,Hotwireanemometer, LaserDoppler Anemometer(LDA).

MeasurementofSpeed: MechanicalTachometers- Electricaltachometers–Stroboscope,Noncontacttypeof tachometer

MeasurementofAccelerationandVibration: Differentsimpleinstruments–PrinciplesofSeismicinstruments– Vibrometer andaccelerometer using this principle.

UNIT–IV

StressStrainMeasurements: Varioustypesofstressandstrainmeasurements–electricalstraingauge–gaugefactor–methodofusageofresistancestraingaugeforbendingcompressiveandtensilestrains–usageformeasuringtorque, Strain gauge Rosettes.

MeasurementofHumidity–
Moisturecontentofgases,slingpsychrometer,Absorptionpsychrometer,Dewpoint meter.

UNIT–V

MeasurementofForce,TorqueAndPower-Elastic forcemeters, loadcells, Torsionmeters, Dynamometers.

ElementsofControlSystems: Introduction,Importance–Classification–OpenandclosedsystemsServomechanisms– Exampleswith block diagrams– Temperature,speed&positioncontrolsystems.

TextBooks:

1. Mechanical Measurements /Beck With, Marangoni, Linehar/PHIPublisher
2. Measurement Systems: Applications&design /D.SKumar/McGraw Hill Publishers
3. Mechanical Measurements /Shawney/McGrawHill Publishers

ReferenceBooks:

1. Experimental Methods forEngineers /Holman/McGraw-Hill Education
2. Mechanical and Industrial Measurements /R.K. Jain/ Khanna Publishers.
3. Instrumentation and Mechanical Measurements /A.K. Tayal / GalgotiaPublications.

Course Outcomes:

1. Learner should be able to Identify and select proper measuring instrument for specific application Illustrate working principle of measuring instruments**.**
2. Explain calibration methodology and error analysis related to measuring instruments
3. Mathematically model and analyze for different measuments.
4. Acquire knowledge in stress and strain measurements and Humidity measurement.
5. Identify, analysis, and solve mechanical engineering problems useful to the society

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IV Year B. Tech, ME-I Sem			
	3	**0**	**3**

(R18A0327)FINITE ELEMENT ANALYSIS

Objectives:

1. To enable the students to understand fundamentals of finite elementanalysis and the principles involved in the discretization of domain with variouselements, polynomial interpolation and assembly of globalarrays.
2. TolearntheapplicationofFEMequationsfortrussesandBeams
3. To learn the application of FEM equations for axisymmetric problems andCST by
4. TolearntheapplicationofFEMequationsforIso-Parametricandheattransferproblems
5. To learn the application of FEM equations for dynamic analysis

UNIT I

Introduction to Finite Element Method for solving field problems, Stress and Equilibrium, Strain - Displacement relations, Stress - strain relations.

One-Dimensional Problem: finite element modeling, local coordinates and shape functions. Potential Energy approach, Assembly of Global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions.

UNIT II

Trusses: Element matrices, assembling of global stiffness matrix, solution for displacements, reaction, stresses.

BEAMS: Element matrices, assembling of global stiffness matrix, solution for displacements, reaction, stresses.

Unit III

Two Dimensional Problems: Basic concepts of plane stress and plane strain, stiffness matrix of CST element, finite element solution of plane stress problems.

Axi-Symmetric Model: Finite element modelling of axi-symmetric solids subjected to axi-symmetric loading with triangular elements.

Unit IV

Iso-Parametric Formulation: Concepts, sub parametric, super parametric elements, 2 dimensional 4 nodediso-parametric elements, and numerical integration.

Heat Transfer Problems: One dimensional steady state analysis composite wall. One dimensional fin analysis and two-dimensional analysis of thin plate.

Unit V

Dynamic Analysis: Formulation of finite element model, element matrices, evaluation of Eigen values and Eigen vectors for a stepped bar and a beam.

Text Books:

1. Tirupathi.R. Chandrupatla and Ashok D. Belegundu, Introduction to Finite elements in Engineering. PHI.

2. S Senthil, Introduction of Finite Element Analysis. Laxmi Publications.
3. SMD Jalaluddin, Introduction of Finite Element Analysis.Anuradha Publications.
4. The Finite Element Method for Engineers – Kenneth H. Huebner, Donald John Wiley & sons (ASIA) Pte Ltd.

References:

1. K. J. Bathe, Finite element procedures. PHI.
2. SS Rao, The finite element method in engineering. Butterworth Heinemann.
3. J.N. Reddy, An introduction to the Finite element method. TMH.
4. Chennakesava, R Alavala, Finite element methods: Basic concepts and applications. PHI.

Course Outcomes:

1. Identify mathematical model to solve common engineering problems by applying the finite element method and formulate the elements for one dimensional bar structures and solve problems in one dimensional bar structures.
2. DeriveelementmatricestofindstressesintrussesandBeams
3. FormulateFEcharacteristicequationsforaxisymmetricproblemsandanalyzeplain stress,plainstrainandDeriveelementmatrices for CSTelements.
4. FormulateFEcharacteristicequationsforisoparamtericproblemsandheattransferprobl em.
5. Solvedynamicproblemswheretheeffectofmassmattersduringtheanalysis.

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IV Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0328) PRODUCTION AND OPERATIONS MANAGEMENT

(PROFESSIONAL ELECTIVE 3)

Course Objectives:

1. To create a comprehensive exposure toand its significance of POM in Industries.
2. To understand students with various activities of scheduling and control operation to give insight into the ongoing & futuristic trends in the control of inventory.
3. To analyze and apply techniques to quality control
4. To remember the importance of material management.
5. To understand and to apply various analyze in cost reduction in production.

UNIT–I

Introduction to Operations Management:
Role of Operations Management in total management System- Process planning and process design, Production Planning and Control: Basic functions of Production Planning and Control, Production Cycle Project, Job Shop, Assembly, batch and Continuous - Inter Relationship between product life cycle and process life cycle.

UNIT–II

Scheduling and control of production operations:
Aggregate planning, Master Production schedule (MPS), Product sequencing: Sequencing of products in multi- product multi-stage situations - Plant Capacity and Line Balancing. Maintenance Management: Objectives – Failure Concept, Reliability, Preventive and Breakdown maintenance, Replacement policies

UNIT–III

Forecasting: Importanceofforecasting–Typesofforecastinganditsuses–
Generalprinciplesofforecasting– Forecasting techniques –qualitativemethods and quantitivemethods.

UNIT–IV

Resource requirement planning: Resource requirement planning, material requirement planning-manufacturing resource planning (MRP)-general overview of MRP- definitions of terms used in MRP systems-MRP outputs and inputs-MRP computational procedure-Enterprise Resource planning- scope, Benefits, applications.

UNIT–V

Stores Management and materials handling:
Stores management –nature of stores- store lay out-stock verification-classification and codifcation - safety stock Inventory Control. Material handling:-organization of material handling-factors affecting the selection of material handling equipment- types of material handling system-selection of handling system.

TEXT BOOKS:

1. Aswathappa K. and Sridhara Bhat, "Production and Operations Management", 2010, HPH.
2. Mahadevan. B, "Operations Management", 2010, Pearson Education.
3. Paneer Selvam - Production and Operations Management, PHI 2006

REFERENCE BOOKS:

1. Buffa E, Modern Production and Operations Management, John wiley 2007
2. Chary SN, Production and Operations Management, TMH,2009
3. P Rama Murthy -Production and Operations Management , New Age International ,2005

Course Outcomes:

1. The understand significance of POM, students able to Illustrate production planning functions and manage manufacturing functions in a better way.
2. memorable competency in scheduling and sequencing in manufacturing operations and effect affordable manufacturing lead time.
3. To apply the techniques of quality control and control inventory with cost effectiveness.
4. Get conversant with various documents procedural aspects and preparation of orders for various MRP and stores management.
5. Analyzed and applied various techniques in cost reduction.

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IV Year B. Tech, ME-I Sem

L	T/P/D	C
3	-	3

(R18A0329) HEATING VENTILATION AND AIR CONDITIONING

(PROFESSIONAL ELECTIVE 3)

Course Objectives:

1. The course aims to emphasize the importance of heating and ventilation systems.
2. This program includes heating, ventilation and air conditioning.
3. Graduates will possess the skills necessary to obtain an entry-level HVAC Technician position.
4. Graduates will have an understanding of safe HVAC practices and how important they are in the HVAC environment.
5. Graduates will understand the importance of professional behavior and life-long learning, and will meet the challenges of continued technological growth within the field.

UNIT I

INTRODUCTION TO HVAC

Fundamentals-Modes of Heat Transfer-Sensible Heat and Latent Heat-**Basic Components of Air-Conditioning and Refrigeration machines**-Basic Refrigeration System or Vapor Compression Cycle-Pressure – Enthalpy Chart-Function & Types of Compressor-Function & Types of Condenser-Function & Types of Expansion Valves, Function & Types of Evaporator-Accessories used in the System-Refrigerant and Brines

UNIT II

CLASSIFICATION OF AIR-CONDITIONING SYSTEM

Window A/C-Working of Window A/C with Line Diagrams-**Split A/C**-Types - Working of Split A/C with Line Diagrams-**Ductable Split A/C**-Working of Ductable Split A/C with Line Diagrams-Variable Refrigerant Volume (VRV)/ Variable Refrigerant Flow (VRF)-**Ductable Package A/C**-Working of Ductable Package A/C with Line Diagrams

UNIT III

STUDY OF PSYCHROMETRIC CHARTS

Dry Bulb Temperature-Wet Bulb Temperature-Dew Point Temperature-Relative Humidity-Humidity Ratio-Processes, Heating, Cooling, Cooling and Dehumidification, Heating and Humidification

UNIT IV

LOAD CALCULATION

Survey of Building-Cooling Load Steps-Finding Temperature difference (ΔT)- Wall, Glass, Roof, partition-Finding 'U' Factor-Wall, Glass, Roof, Partition-Finding Ventilation

requirement for IAQ-Load Calculations (Manually using E-20 form)- ESHF, ADP & Air Flow Rate (CFM) Calculation

UNIT V

STATIC PRESSURE CALCULATION

Selection of Motor HP-Selection Fan/Blower RPM-**Hydronic System-**Classification of Water Piping-Pipe sizing for chill water system-Fittings used in the HVAC Piping System-Valves used in the HVAC Piping System-Function of Valves-Openings for CHW Pipes passing through Wall-Sectional drawing @ CHW Pipe supports-Pump Head Calculation-Selection of Pump

REFERENCES:

1. HVAC Fundamentals Volume-l / James E. Brumbou / Audel / 4 Edition
2. Fundamentals of HVAC Systems / Robert Mcdowall / Academic Press / 2007
3. Home Heating & Air Conditioning systems / James Kittle / MGH
4. HVAC Fundamentals / Samuel C. Sugarman / Fairmont Press / 2005.
5. R&AC Hand Book by ISHRAE
6. Ventilation Systems: Design and Performance/ Hazim B. Awbi. / Routledge / 2007.
7. Portable Ventilation Systems Hand Book / Neil McManus / CRC Press / 2000.
8. Design of Industrial Ventilation Systems / John L Alden / Industrial Press / 5 Edition.
9. Industrial Ventilation Applications / ISHRAE Hand Book / 2009.
10. HVAC Hand book / ISHRAE.

Course Outcomes:

1. Students will assist in the installations of Heating, Air Conditioning and Refrigeration equipment.
2. Perform preventive maintenance on heating and air conditioning systems.
3. Students will identify site hazards.
4. The student shall understand the principles and working HVAC systems.
5. To be able to study and analyze psychrometric chart in refrigeration systems. Develop problem solving skills through the application of thermodynamics.

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IV Year B. Tech, ME-I Sem

L	T/P/D	C
3	0	3

(R18A0330) PRODUCT DESIGN AND DEVELOPMENT (PROFESSIONAL ELECTIVE 3)

Course Objectives:

1. To study the basic concepts of product design and development process.
2. To study the applicability of product design and development in industrial applications.
3. To acquaint the practical knowledge regarding conceptualization design and development of a new product.
4. To study the concepts of Ergonomics in context of the product design has been explained with the help of case studies.
5. To understand the fundamental concept of Rapid Prototyping as well the working principles of the basic rapid prototyping techniques

Unit-I

Introduction: Design theory, design materials, human factors in design, man-machine system, applied ergonomics, characteristics of successful product development, challenges to product development. Development process and product planning: Generic development process, Concept development, product development process flows, product planning process, identity customer needs

Unit-II

Product specifications and concept generation: Product specification, steps to establish the target specifications, Concept generation, five step concept generation method, concept selection, concept screening, concept testing, product architecture

Unit-III

Product design methods: Creative and rational, clarifying objectives - the objective tree method, establishing functions- the function analysis method, setting requirements – the performance specification method, determining characteristics – the QFD method, generating alternatives – morphological chart method, evaluating alternatives – the weighted objective method, improving details – the value engineering method and design strategies.

Unit-IV

Design for manufacture: Estimating manufacturing cost, reducing component, assembly and support costs, design for assembly, design for disassembly, design for environment, design for graphics and packaging, effective prototyping – principle and planning

Unit-V

Fundamentals of PLM: Product data or Product information, Product lifecycle management concept, Information models and product structures-Information model, the product information (data) model, the product model, Reasons for the deployment of PLM systems.

TEXT BOOKS:

1. K.T. Ulrich and S.D. Eppinger, "Product design and development", Tata McGraw Hill
2. Chitale& Gupta, "Product Development", Tata McGraw Hill
3. Monks, J. G., "Operations Management", McGraw Hill, 1997.
4. David G Ullman, "The Mechanical Design Process." McGrawhillInc Singapore 1992 N J M Roozenberg , J Ekels , N F M Roozenberg " Product Design Fundamentals and Methods ." John Willey & Sons 1995

REFERENCEBOOKS:

1. George Dieter, A material and Processing approach, McGraw Hill.
2. KemnnethCrow,"ConcurrentEngg./Integrated Product Development", DRM Associates,26/3, Via Olivera, Palos Verdes, CA 90274(310) 377-569, Workshop Book.
3. Stephen Rosenthal, "Effective Product Design and Development", Business One Orwin, Homewood, 1992, ISBN 1-55623-603-4.
4. StaurtPugh,"Tool Design – Integrated Methods for Successful Product Engineering", Addison Wesley Publishing, New york, NY.
5. Hollins B & Pugh S "Successful Product Design." Butter worths London.
6. Baldwin E N &Neibel B W "Designing for Production." Edwin Homewood Illinois
7. Jones J C "Design Methods." Seeds of Human Futures. John Willey New York.
8. Bralla J G "Handbook of Product Design for Manufacture, McGrawhillNewYork.

Course Outcomes:

1. Ability to select suitable design and development process for a given application.
2. Suitable ergonomic principles can be identified for the product development.
3. Appropriate standardization method can be use for product and process development.
4. Cost estimation methods can be developed to minimise the cost.
5. Able to classify and select proper rapid prototyping and reverse engineering techniques for specific technical applications.

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IV Year B. Tech ME - I Sem

L	P	C
0	3	1.5

(R18A0389)MECHANICALMEASUREMENTSAND INSTRUMENTATION LAB

Course Objectives:

1. To prepare the students for successful career in industry and motivate for higher education.
2. To provide strong foundation in basic science and mathematics necessary to formulate, solve and analyze Control and Instrumentation problems
3. To provide strong foundation in circuit theory, control theory and signal processing concepts.
4. To provide good knowledge of Instrumentation systems and their applications.
5. To provide knowledge of advanced control theory and its applications to engineering problems and learn about representation of materials, fits and estimation of limits, tolerances

LIST OF EXPERIMENTS:

1. Calibration of Pressure Gauges
2. Study and calibration of LVDT transducer for displacement measurement.
3. Calibration of strain gauge for temperature measurement.
4. Calibration of thermocouple for temperature measurement.
5. Calibration of capacitive transducer for angular displacement.
6. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
7. Calibration of resistance temperature detector for temperature measurement.
8. Study and calibration of McLeod gauge for low pressure
9. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
10. Study and calibration of Rotameter for flow measurement.

Course Outcomes:

1. At the end of the course, the student will be able to characterize and calibrate measuring devices.
2. Identify and analyze errors in measurement.
3. Analyze measured data using regression analysis.
4. To understand the Calibration of Pressure Gauges temperature.
5. Analyze LVDT, capacitive transducer and rotometer.

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IV Year B. Tech ME - I Sem	L	P	C
	0	3	1.5

(R18A0389) AUTOMATION AND CONTROL ENGINEERING LAB

Course Objectives:

1. To learn the different types of system and process controls in Automation.
2. To identify and study different control system components.
3. To understand simulation on controllers.
4. To demonstrate working of different actuating systems and sensors.
5. To learn and demonstrate IoT.

Any 10 of the following experiments has to be performed

1. Simulation on P Controller.
2. Simulation on P+I Controller.
3. Simulation on P+D Controller.
4. Simulation of Hydraulic Actuation System.
5. Simulation of Pneumatic Actuation System.
6. Simulation on Stepper Motor.
7. Simulation on Logic gates, decoders and flip-flops.
8. Determination of Ambient Temperature using Arduino.
9. Experiment on Photo-resistor and LED using Arduino.
10. Determination of Temperature using IoT.
11. Determination of Humidity using IoT.
12. Experiment on speed control of stepper motor.
13. Obstacle detection using sensors.
14. Experiment on assessment of load characteristics of solar panels in series & parallel connection.

Course Outcomes: Students will be able

1. To apply the knowledge in real time applications.
2. To understand the components of control system.
3. To gain knowledge on simulation softwares.
4. To work on different actuating systems & sensors.
5. To understand technologies like IoT, machine languages.

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IV Year B. Tech, ME-I Sem

L	T/P/D	C
0	6	3

(R18A0395) PROJECT –I (PROJECT OR SUMMER INTERNSHIP)

COURSE OBJECTIVES:

1. To acquaint with the process of undertaking literature survey/industrial visit and identifying the problem
2. To familiarize the process of solving the problem in a group
3. To acquaint with the process of applying basic engineering fundamental in the domain of practical applications
4. To inculcate the process of research
5. To work with group and share responsibilities.

COURSE OUTCOMES:

1. Identify a topic in advanced areas of Mechanical Engineering.
2. Review literature to identify gaps and define objectives & scope of the work
3. Generate and implement innovative ideas for social benefit.
4. Develop conceptual design and methodology of solution for the problem.
5. Learn team work and share responsibility.

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IV Year B. Tech, ME-II Sem

L	T/P/D	C
3	0	3

(R18A0331) AUTOMOBILEENGINEERING

Course Objectives:

1. To understand basics of automobile engineering, conversant with vehicle structure & Engines.
2. To make the student conversant with auxiliary systems.
3. To make the student conversant with transmission systems.
4. To make the student conversant with steering , brakes & suspension systems
5. To make the student conversant with alternative energy sources.

UNIT–I VEHICLE STRUCTURE AND ENGINES

Types of automobiles vehicle construction and different layouts, chassis, frame and body, Vehicle aerodynamics (various resistances and moments involved), IC engines components-functions and materials, variable valve timing (VVT).

UNIT–IIENGINE AUXILIARY SYSTEMS

Electronically controlled gasoline injection system for SI engines, Electronically controlled diesel injection system (Unit injector system, Rotary distributor typeand common rail direct injection system), Electronic ignition system (Transistorized coil ignition system, capacitive discharge ignition system), Turbo chargers (WGT, VGT), Engine emission control by three way catalytic converter system, Emission norms (Euro and BS).

UNIT–IIITRANSMISSION SYSTEMS

Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints, Differential and rear axle, Hotchkiss Drive and Torque Tube Drive.

UNIT–IVSTEERING, BRAKES AND SUSPENSION SYSTEMS

Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Types of Suspension Systems, Pneumatic and Hydraulic Braking Systems, Antilock Braking System (ABS), electronic brake force distribution (EBD) and Traction Control.

UNIT–VALTERNATIVE ENERGY SOURCES

Use of Natural Gas, Liquefied Petroleum Gas, Bio-diesel, Bio-ethanol, Gasohol and Hydrogen in Automobiles- Engine modifications required Performance, Combustion and Emission Characteristics of SI and CI engines with these alternate fuels - Electric and Hybrid Vehicles, Fuel Cells.

TEXTBOOKS:

1. Jain K.K. and Asthana .R.B, Automobile Engineeri Tata McGraw Hill Publishers, New Delhi, 2002.

2. Kirpal Singh, Automobile Engineering, Vol 1 & 2, Seventh Edition, Standard Publishers, New
Delhi, 13th Edition 2014.

REFERENCEBOOKS:

1. Ganesan V. Internal Combustion Engines, Third Edition, Tata McGraw-Hill, 2012.
2. Heinz Heisler, Advanced Engine Technology, SAE International Publications USA, 1998.
3. Joseph Heitner, Automotive Mechanics, Second Edition, East-West Press, 1999.
4. Martin W, Stockel and Martin T Stockle , Automotive Mechanics Fundamentals, The Good
heart - Will Cox Company Inc, USA ,1978.
5. Newton ,Steeds and Garet, Motor Vehicles, Butterworth Publishers,1989.

Course Outcomes:

1. Ability to identify & description of different components & system of automobile.
2. Students will able to explain working principle of various systems automobile.
3. Students will able to explain working principle of transmission systems.
4. Able to understand steering, brakes & suspension systems.
5. Students will be able to understand different alternative energy sources used in IC engine.

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	L	T/P/D	C
III Year B. Tech, ME-II Sem	**3**	**0**	**3**

(R18A0332) INDUSTRIAL ENGINEERING AND MANAGEMENT (PROFESSIONAL ELECTIVE 4)

Course Objectives:

1. To understand the concepts of management and organization structure
2. To Remember the plant location and work study objectives and work measurements
3. To Create importance of material management and TQM
4. To evaluate PERT CPM for various projects
5. To apply quality control techniques and to understand functions of HRM

UNIT-I

Concepts of Management and Organization – Functions and Levels of Management. Evolution of Management Thought, Taylor's Scientific Management, Fayol's Principles of Management, Douglas Theory X and Y, Mayo's Hawthorne Experiments, Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs.

Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types of Organizations- their merits and demerits.

UNIT-II

Plant location: definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant. Plant Layout – definition, objectives, types of production– various data analyzing forms

Work Study: Definition, objectives, method study- definition, objectives, steps involved-various types of associated charts. Work measurement-definition, time study, Work Sampling– definition, steps involved, standard time calculations.

UNIT-III

Materials Management: Objectives, Inventory – functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems-Continuous and periodical review systems. Stores Management and Stores Records. Purchase management, functions of purchase manager.

UNIT-IV

Introduction to PERT / CPM: Project management, Network modeling-probabilistic model, various types of activity times estimation-programme evaluation review techniques- Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT-V

Inspection and quality control: Types of inspections - SQC-techniques-variables and attributes-assignable and non assignable causes- variable control charts, X and R charts, attributes control charts, p and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Human Resource Management: Functions of HRM, different types of evaluation methods. Job description.

TEXT BOOKS:

1. Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition, 2004.
2. Industrial Engineering and Management O.P. Khanna Dhanpat Rai.
3. Industrial Engineering and Management by BUFFA .

REFERENCE BOOKS:

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2005.
2. Phillip Kotler, Marketing Management, Pearson, 2004.
3. A.R.Aryasri, Management Science for JNTU (B.Tech), Tata McGraw-Hill, 2002.

Course Outcomes:

1. The concepts of management and organization structureare understood by students
2. The plant location and work study objectives and learned and remembered
3. Importance of material management and TQM are known
4. Evaluated PERT CPM various techniques for various projects
5. Applied quality control techniques and remembered functions of HRM

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IV Year B. Tech, ME-II SEM

L	T/P/D	C
3	0	3

(R18A0333) MAINTENANCE AND SAFETY ENGINEERING (PROFESSIONAL ELECTIVE 4)

Course Objectives:

1. To ensure the desired plant availability at an optimum cost within the safety prescription.
2. Student able to know about the objectives of maintenance.
3. To minimize the total cost of unavailability and resources.
4. Explain the repair methods of beds and slide ways.
5. Discuss various condition monitoring techniques.

UNIT-I

Introduction to the Development of Industrial Safety and Management: History and development of Industrial safety: Implementation of factories act, Safety and productivity, Safety organizations. Safety committees and structure, Role of management and role of Govt. in Industrial safety.

UNIT-II

Accident Preventions, Protective Equipments and the Acts: Personal protective equipment, Survey the plant for locations, Part of body to be protected, Education and training in safety, Prevention causes and cost of accident, Housekeeping, First aid, Firefighting equipment, Accident reporting, Investigations, Industrial psychology in accident prevention, Safety trials.

UNIT-III

Safety Acts: Features of Factory Act, Introduction of Explosive Act, Boiler Act, ESI Act, Workman's compensation Act, Industrial hygiene, Diseases prevention, Ergonomics, Occupational diseases, stress, fatigue, health, safety and the physical environment, methods of controlling chemical hazards, safety and the physical environment, Control of industrial noise and protection against it, Code and regulations for worker safety.

UNIT-IV

Principles and Practices of Maintenance Planning: Basic Principles of maintenance planning – Objectives, Sound Maintenance systems – Reliability and machine availability, Equipment Life cycle, Measures for Maintenance Performance: Equipments breakdowns, Mean Time Between Failures and Repair, Factors of availability, Maintenance organization and economics.

UNIT-V

Maintenance Policies and Preventive Maintenance:

Maintenance categories –Merits of each category – Preventive maintenance, Maintenance schedules: Repair cycle, Principles and methods of lubrication, Fault Tree Analysis, Total Productive Maintenance: Methodology and Implementation.

TEXT BOOKS:

1) Industrial Maintenance Management -Srivastava, S.K. - S. Chand and Co.
2) Occupational Safety Management and Engineering Willie Hammer - Prentice Hall
3) Installation, Servicing and Maintenance Bhattacharya, S.N. - S. Chand and Co.

REFERENCE BOOKS:

1) Occupational Safety Management and Engineering Willie Hammer - Prentice Hall
2) Reliability, Maintenance and Safety Engineering by Dr. A. K. Gupta
3) A Textbook of Reliability and Maintenance Engineering by Alakesh Manna.

Course Outcomes:

1. Describe the various categories of maintenance.
2. Assemble, dismantle and align mechanisms in sequential order.
3. Carry out plant maintenance using tribology, corrosion and preventive maintenance.
4. Student gets the exposure of Maintenance Policies and Preventive Maintenance.
5. Explain the repair methods of material handling equipments.

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	L	T/P/D	C
IV Year B. Tech, ME-II SEM	**3**	**0**	**3**

(R18A0334) TECHNOLOGY MANAGEMENT
(PROFESSIONAL ELECTIVE 4)

Course Objectives

1. The course aims at providing an overview of various issues connected with Management of Technology in organizations.
2. The course provides an exposure to technology related issues like technology identification, technology forecasting, technology acquisition and technology absorption.
3. The course also provides an appreciation of linkages of technology with policy and support systems.
4. This course aims to know Technology forecasting, technology acquisition and technology absorption.
5. This course aims to know Technology environment in country Science & Technology in India.

UNIT – I

Introduction, Definitions, Role and importance, Technology developments, implications of Technology Management, Technology change, TLC, Diffusion and Growth of Technologies, Technological Transformation alternatives, Socio-Economic planning, Macro effects of Technology change.

UNIT – II

Technology Development and Acquisition - Forecasting and Technology Innovation chain, Role of Technology Forecasting approaches and methodologies; Technology Strategy, Generation, and Development.

UNIT – III

Technology Transfer - Models, Modes, Technology search strategy, Dimensions of Technology Transfer, Features & Routes of Technology Transfer, Technology absorption capabilities, Pricing of Technology Transfer agreements, Code of conduct for Technology transfer, Government initiative.

UNIT – IV

Technology absorption and diffusion - Technology - package and Technology dependence, concepts, constraints of Technology absorption, Technology import in India, Government initiatives, Benefits of Technology absorption. Technology Assessment (TA) Organization

UNIT – V

Technology Environment - Science & Technology in India, R &D, Technology Missions, Trade Policy Missions, Trade Policy, Education, and other policies, Linkages. Technology Support Systems Technology up-gradation, Technology Information Systems (TIS),

Technology Strategy for a firm, Technology Gaps and needs,Evaluation of Technology option and Routes, R&D Resource Management.

Suggested Readings

1. Sharif Nawaz: Management of Technology Transfer & Development, APCFT, Bangalore, 1983.
2. Rohtagi P K, Rohtagi K and Bowonder B: Technological Forecasting, Tata McGraw Hill, New Delhi.
3. Betz Fredrick: Managing Technology, Prentice Hall, New Jersey.
4. Gaynor: Handbook of Technology Management, McGraw Hill.
5. Tarek Khalil: Management of Technology, McGraw Hill International, 2000.

Course Outcomes:

1. Understanding Technology Management and applying thoughts.
2. Carry out Technology Transfers.
3. Student gets the exposure of Technology strategy.
4. Student can understand the Technology forecasting, technology acquisition and technology absorption.
5. Student can explain Technology environment in country Science & Technology in India.

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IV Year B. Tech, ME-II Sem

L	T/P/D	C
3	0	3

(R18A0335) RENEWABLE ENERGY SOURCES (PROFESSIONAL ELECTIVE 5)

Course Objectives:

1. To explain concept of various forms of Non-renewable and renewable energy
2. To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications
3. To analysis the environmental and cost economics of using renewable energy sources compared to fossil fuels.
4. At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources
5. This course aims to understand the Technologies For Effective Utilization Of Renewable Energy Sources.

UNIT—I

Principles of Solar Radiation: Role and potential of new and renewable source, the solar energy option. Environmental impact of solar power – Physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measLiring solar radiation and sun shine, solar radiation data.

UNIT —II

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.
Solar Energy Storage and Applications: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications – solar heating? cooling techniques, solar distillation and drying, Photovoltaic energy conversion.

UNIT — III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics.
Bio-Mass: Principles of Bio-Conversion, Anaerobic /aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, l.C. Engine operation, and economic aspects.

UNIT –IV

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India. OTEC: Principles, utilization, setting of OTEC plants, thermodynamic cycles. Tidal and Wave Energy: Potential and conversion techniques, mini-hydel power plants, their economics.

UNIT —V

Direct Energy Conversion: Need for DEC. Carnot cycle, limitations, Principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thompson effects, figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principle, faraday's laws, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable Energy Sources I Twidell& Weir / Taylor and Francis / 2nd Special Indian Edition.
2. Non- conventional Energy Sources / G.D. Rai / DhanpatRal and Sons.

REFERENCE BOOKS:

1. Energy Resources Utilization and Technologies /Anjaneyulu & Francis/ BS Publications/2012.
2. Principles of Solar Energy / Frank Krieth& John F Kreider / Hemisphere Publications.
3. Non-Conventional Energy / Ashok V Desai I Wiley Eastern.
4. Non-Conventional Energy Systems / K Mittal / Wheeler.
5. Renewable Energy Technologies I Ramesh & Kumar / Narosa.
6. Renewable Energy Resources I Tiwari and Ghosal I Narosa.

Course Outcomes:

1. Understanding Of Commercial Energy And Renewable Energy Sources
2. Knowledge In Working Principle Of Various Energy Systems
3. Capability To Do Basic Design Of Renewable Energy Systems
4. Upon Completion Of This Course, The Students Can Able To Identify The New
5. Methodologies / Technologies For Effective Utilization Of Renewable Energy Sources.

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IV Year B. Tech, ME-II Sem

L	T/P/D	C
3	-	3

(R18A0336) BIOMASS ENGINEERING

(OPEN ELECTIVE -I)

Course Objectives:

1. Gain knowledge on biomass energy.
2. Gain knowledge of sustainable energy.
3. Gain knowledge on renewable energy policies.
4. To have an exposure on the types of biomass, its surplus availability and characteristics.
5. Analyze the technologies available for conversion of biomass to energy in terms of its technical competence and economic implications.

UNIT —I

Origin of Biomass: Resources - Classification and characteristics - Techniques for biomass assessment - Application of remote sensing in forest assessment - Biomass estimation.

UNIT —II

Thermochemical Conversion: Different processes - Direct combustion – Incineration – Pyrolysis - Gasification and liquefaction - Economics of thermochemical conversion.

UNIT —III

Biological Conversion: Biodegradation and biodegradability of substrate - Biochemistry and process parameters of biomethanation - Biogas digester types - Digester design and biogas utilization. Biomethanation Process - Economics of biogas plant with their environmental and social impacts - Bioconversion of substrates into alcohol - Methanol & ethanol Production - Organic acids – Solvents - Amino acids - Antibiotics etc.

UNIT —IV

Chemical Conversion: Hydrolysis & hydrogenation - Solvent extraction of hydrocarbons - Solvolysis of wood - Biocrude and biodiesel - Chemicals from biomass

UNIT —V

Power Generation: Utilisation of gasifier for electricity generation - Operation of spark ignition and compression ignition engine with wood gas – Methanol - ethanol & biogas - Biomass integrated gasification/combined cycles systems - Sustainable cofiring of biomass with coal - Biomass productivity - Energy plantation and power programme.

REFERENCE BOOKS :

a. Biotechnology and Alternative Technologies for Utilization of Biomass, Chakraverthy A
b. Biogas Systems: Principles and Applications, Mital K.M
c. Biomass Energy Systems, Venkata Ramana P and Srinivas S.N

d. Gasification Technologies, A Primer for Engineers and Scientists Rezaiyan. J and N. P. Cheremisinoff.
e. Biomass Gasification – Principles and Technology, Tom B Reed, Noyce Data Corporation, 1981.

TEXTBOOKS:

- Bio Energy Technology Thermodynamics and costs, David Boyles, Ellis Hoknood Chichester,1984.
- Khandelwal KC, Mahdi SS, Biogas Technology – A Practical Handbook, Tata McGraw Hill, 1986. Bio Energy for Rural Energisation, Mahaeswari, R.C. Concepts Publication,1997
- Best Practises Manual for Biomass Briquetting, I R E D A, 1997.
- The briquetting of Agricultural wastes for fuel, Eriksson S. and M. Prior, FAO Energy and Environment paper, 1990
- .Thermochemical Characterization of Biomass, Iyer PVR , M N E S

Course Outcome:

1. Students should able to get knowledge on bio-mass energy.
2. Students should able to understand the concept Thermo chemical Conversion.
3. Students should able to implement Biological Conversion.
4. Students should able to know about Chemical Conversion.
5. Student gets a practical understanding on the various biomass energy conversion technologies and its relevance towards solving the present energy crisis.

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L	T/P/D	C
3	0	3

IV Year B. Tech, ME-II Sem

(R18A0337) ENERGY CONSERVATION AND MANAGEMENT (PROFESSIONAL ELECTIVE 4)

Course Objectives:

1. Understand and analyze the energy data of industries.
2. Carryout energy accounting and balancing.
3. Conduct energy audit and suggest methodologies for energy savings and utilize the available resources in optimal ways.
4. To impart knowledge in the domain of energy conservation.
5. To bring out Energy Conservation Potential and Business opportunities across different user segments under innovative business models.

UNIT I : INTRODUCTION:
Energy – Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization –Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing.

UNIT II : ELECTRICAL SYSTEMS:
Components of EB billing – HT and LT supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors – Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficacy, LED Lighting and scope of Encon in Illumination.

UNIT III : THERMAL SYSTEMS:
Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and encon measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories

UNIT IV : ENERGY CONSERVATION IN MAJOR UTILITIES:
Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets

UNIT V: ECONOMICS: Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing –ESCO concept

TEXT BOOKS:

- Energy Manager Training Manual (4 Volumes) available at www.energymanager training.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004.

REFERENCES:

- Witte. L.C., P.S. Schmidt, D.R. Brown, “Industrial Energy Management and Utilisation” Hemisphere Publ, Washington, 1988.

- Callaghn, P.W. “Design and Management for Energy Conservation”, Pergamon Press, Oxford, 1981.
- Dryden. I.G.C., “The Efficient Use of Energy” Butterworths, London, 1982
- Turner. W.C., “Energy Management Hand book”, Wiley, New York, 1982.
- Murphy. W.R. and G. Mc KAY, “Energy Management”, Butterworths, London 1987.

Course Outcomes:

Upon completion of this course, the students can able to analyze the energy data of industries.

1. Students should able to carry out energy accounting and balancing.
2. Students should able to suggest methodologies for energy savings.
3. Students can able to analyze the energy data of industries.
4. Apply knowledge of Energy Conservation Opportunities in a range of contexts.
5. Develop innovative energy efficiency solutions and demand management strategies.

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IV Year B. Tech, ME-II Sem

L	T/P/D	C
0	12	6

(R18A0394) PROJECT -II

COURSE OBJECTIVES

1. To survey selected topics addressing issues of science in society today.
2. To familiarize with scientific literature.
3. To collect information on each topic.
4. To assimilate, synthesize and integrate information.
5. To organize the information on each topic into an analysis.

COURSE OUTCOMES

1. Identify and compare technical and practical issues related to the area of program specialization.
2. Outline annotated bibliography of research demonstrating scholarly skills.
3. Prepare a well-organized report employing elements of technical writing and critical thinking.
4. Demonstrate the ability to describe, interpret and analyse technical issues and develop competence in presenting.
5. To effectively communicate by making an oral presentation before an evaluation committee.



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Maisammaguda, Dhulapally (Post Via Hakimpet), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

MASTERS PROGRAMME

DEPARTMENT OF
MASTER OF BUSINESS ADMINISTRATION

COURSE STRUCTURE AND SYLLABUS

(Batches admitted from the academic year 2018 - 2019)

Note: *The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.*

PRELIMINARY DEFINITIONS AND NOMENCLATURES

*"Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

*"Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

*"Commission" means University Grants Commission.

*"AICTE" means All India Council for Technical Education.

*"University" means the Jawaharlal Nehru Technological University, Hyderabad.

*"College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

*"Program" means:

Master of Business Administration Degree Program

PG Degree Program: MBA

*"Branch" means specialization in a program like MBA Degree Program.

*"Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

*T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
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Maisammaguda, Dhulapally (Post Via Hakimpet), Secunderabad – 500100, Telangana State, India.
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VISION

- To become a model institution in the fields of Engineering Technology and Management.
- To have a perfect synchronization of the ideologies of MRCET with challenging demands of International Pioneering Organizations

MISSION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become pioneers of Indian vision of modern society

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart the quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

Name of the Programme: Master of Business Administration (MBA)
Programme Structure

MBA I YEAR I SEMESTER

Course Code	Subject Titles	L	T/P	C	Max. Marks	
					INT	EXT
R18MBA01	Management and Organisational Behaviour	3	-	3	30	70
R18MBA02	Managerial Economics	3	-	3	30	70
R18MBA03	Financial Accounting and Analysis	3	1	3	30	70
R18MBA04	Statistics for Managers	3	1	3	30	70
R18MBA05	Business Environment & Business Laws	3	-	3	30	70
R18MBA06	Information Technology for Managers	3	-	3	30	70
R18MBA07 R18MBA08 R18MBA09	Open Elective I: 1. Cross Culture Management 2. Innovation Management 3. Disaster Management	3	-	3	30	70
R18MBA10	Business Communication & Soft Skills	3	1	3	30	70
Total		**24**	**3**	**24**	**240**	**560**

MBA I YEAR II SEMESTER

Course Code	Subject Titles	L	T/P	C	Max. Marks	
					INT	EXT
R18MBA11	Human Resource Management	3	-	3	30	70
R18MBA12	Financial Management	3	1	3	30	70
R18MBA13	Marketing Management	3	-	3	30	70
R18MBA14	Quantitative Analysis for Business Decisions	3	1	3	30	70
R18MBA15	Production and Operations Management	3	1	3	30	70
R18MBA16	Business Ethics & Corporate Governance	3	-	3	30	70
R18MBA17 R18MBA18 R18MBA19	Open Elective II: 1. Management Information Systems & ERP 2. Intellectual Property Rights 3. Entrepreneurship	3	-	3	30	70
R18MBA20	Personal Effectiveness	3	1	3	30	70
Total		**24**	**4**	**24**	**240**	**560**

MBA II YEAR I SEMESTER

Course Code	Subject Titles	L	T/P	C	Max. Marks	
					INT	EXT
R18MBA21	Strategic Management	3	-	3	30	70
R18MBA22	Research Methodology	3	-	3	30	70
	Elective-I (Marketing/Finance/HR/Systems)	3	-	3	30	70
	Elective-II (Marketing/Finance/HR/Systems)	3	-	3	30	70
	Elective-III (Marketing/Finance/HR/Systems)	3	-	3	30	70
	Elective-IV (Marketing/Finance/HR/Systems)	3	-	3	30	70
	Elective-V (Marketing/Finance/HR/Systems)	3	-	3	30	70
	Elective-VI (Marketing/Finance/HR/Systems)	3	-	3	30	70
Total		**24**	**-**	**24**	**240**	**560**

MBA II YEAR II SEMESTER

Course Code	Subject Titles	L	T/P	C	Max. Marks	
					INT	EXT
R18MBA23	Annual Report Analysis-Case Study	-	3	2	-	100
R18MBA24	Business Best Practices-Case Study	-	3	2	-	100
R18MBA25	Innovative Entrepreneurship-Case Study	-	3	2	-	100
R18MBA26	Project Work & Comprehensive Viva-Voce	-	-	12	50	150
R18MBA27	Internship	-	-	6	-	100
Total		**-**	**9**	**24**	**50**	**550**
Grand Total		**72**	**16**	**96**	**770**	**2230**

1. Specializations are offered in the second year MBA programme.
2. Dual specialization system is followed in this college. The student has to choose any two out of the four specializations offered. The specializations do remain the same across the semesters. The four specializations offered are:
   A. Finance,
   B. Human Resources,
   C. Marketing, and
   D. Information Systems
3. The courses available under each specialization are given hereunder.
4. From each chosen specialization the student has to select minimum four elective courses in the II year I semester as major and another two elective courses as minor from any of the given specialisations. The elective courses offered under each specialization in each semester are given hereunder.

Specialization-Wise Elective Courses Offered in the Second Year MBA First Semester

MARKETING ELECTIVE

Course Code	Subject Titles	L	C	Max. Marks	
				INT	EXT
R18MBA28	Consumer Behaviour	3	3	30	70
R18MBA29	Integrated Marketing Communications & Sales	3	3	30	70
R18MBA30	Logistics & Supply Chain Management	3	3	30	70
R18MBA31	Services Marketing	3	3	30	70
R18MBA32	Retailing Management	3	3	30	70
R18MBA33	Customer Relationship Management	3	3	30	70

FINANCE ELECTIVE

Course Code	Subject Titles	L	C	Max. Marks	
				INT	EXT
R18MBA34	Security Analysis and Portfolio Management	3	3	30	70
R18MBA35	Financial Institutions, Markets & Services	3	3	30	70
R18MBA36	Strategic Investment and Financing Decisions	3	3	30	70
R18MBA37	International Financial Management	3	3	30	70
R18MBA38	Strategic Management Accounting	3	3	30	70
R18MBA39	Financial Derivatives	3	3	30	70

HR ELECTIVE

Course Code	Subject Name	L	C	Max. Marks	
				INT	EXT
R18MBA40	Performance Management	3	3	30	70
R18MBA41	Training & Development	3	3	30	70
R18MBA42	Management of Industrial Relations	3	3	30	70
R18MBA43	International Human Resource Management	3	3	30	70
R18MBA44	Compensation & Reward Management	3	3	30	70
R18MBA45	Leadership & Change Management	3	3	30	70

SYSTEMS ELECTIVE

Course Code	Subject Name	L	C	Max. Marks	
				INT	EXT
R18MBA46	Business Intelligence	3	3	30	70
R18MBA47	Database Management Systems	3	3	30	70
R18MBA48	Decision Support Systems	3	3	30	70
R18MBA49	E-Business	3	3	30	70
R18MBA50	Cyber Security	3	3	30	70
R18MBA51	Information System Control and Audit	3	3	30	70

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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MBA I YEAR I SEM

R18MBA01 MANAGEMENT AND ORGANISATIONAL BEHAVIOUR

Course Aim:

- To understand the fundamentals underlying the management of an organization. To understand the dynamics of organizational behaviour.

Learning Outcome:

- The students should be able to learn the history of management and the contributions of important management researchers.
- The students can learn how to delegate authority and use power to influence people to get the work done through proper communication and control.
- To understand how employees behave in organizations. Students should be able to correct their individual behaviour and group behaviour. They will also be able to motivate and lead employees towards achievement of organizational mission and objectives.

Unit-I: Theories of Management

Basics of Management - Importance of Management - Functions of Management - Levels of Management - Scientific Management Theory - Fayol's Fourteen Principles of Management - Bureaucratic Theory - Human Relations Movement - Systems and Contingency theory.

Unit-II: Planning and Organising

Introduction to Planning: Features of Planning - Principles of Planning - Importance of Planning - Forms of Planning - Guidelines for Effective Planning - Steps in Planning Process. Organising: Principles of Organizing - Authority - Organizational Design - Job Design - Relation between Authority, Power and Influence

Unit-III: Leadership and Motivation Theories

Leadership Theories: Great Man Theory - Trait Theory - The Managerial Grid Model - Path Goal theory - Fiedler's Contingency Theory.

Motivational Theories: Maslow's Hierarchy of Needs - Two-factor theory of Motivation - Theory X and Theory Y - McClelland's Need Theory. Communication: Process - Barriers - Guidelines for Effective Communication.

Unit-IV: Organizational Behaviour

Elements of OB - Disciplines of OB. Perception Process - Attitudes. Personality Theories: Extrovert & Introvert - Type-A & Type-B - Sigmund Freud's Psychoanalytic Theory. Stress Management.

Unit-V: Group Behaviour

Foundations of Group Behaviour - Defining and Classifying Groups - Stages of Group Development - Group Decision Making - Understanding Work Teams - Types of Teams - Creating Effective Teams.

REFERENCES:

- Robert N. Lussier, Management Fundamentals–Concepts, Applications, Skill Development, Cengage Learning.
- Stephen P. Robbins, Timothy: Organizational Behavior, Pearson.
- L. M. Prasad, Principles and Practices of Management, Revised Edition, Sulthan Chand Publishing.
- Udai Pareek, Sushma Khanna, Organizational Behavior, Oxford Publishing.
- Stephen P. Robbins, Timothy: Organizational Behaviour, Pearson.
- Griffin & Moorhead, Organizational Behaviour, 10th Edition, Cengage Publishing.

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MBA I Year I SEM

R18MBA02 MANAGERIAL ECONOMICS

Course Aim:

- To enable students acquire knowledge to understand the economic environment of an organization.

Learning Outcome:

- Students should be able to understand the basic economic principles, forecast demand and supply and should be able to estimate cost and understand market structure and pricing practices.

Unit-I: Introduction to ME

Definition - Nature and Scope - ME as an Inter-disciplinary - Basic Economic Principles - The Concept of Opportunity Cost - Production Possibility Curve - Incremental Concept - Scarcity - Marginalism - Equi-marginalism - Time perspective - Discounting Principle.

Unit-II: Theory of Demand

Demand analysis - Law of Demand - Movement in Demand Curve - Shift in the Demand Curve - Elasticity of Demand - Types & Significance of Elasticity of Demand - Measurement Techniques of Price Elasticity - Demand Forecasting and its Techniques - Consumers Equilibrium - Cardinal Utility Approach - Indifference Curve Approach - Consumer Surplus.

Unit-III: Production Analysis

Production Function - Production Functions with One/Two Variables - Cobb-Douglas Production Function - Marginal Rate of Technical Substitution - Isoquants and Isocosts - Returns to Scale and Returns to Factors - Economies of Scale.

Unit-IV: Cost Theory and Estimation

Cost concepts - Determinants of Cost - Cost-Output Relationship in the Short Run and Long Run - Short Run vs. Long Run Costs - Average Cost Curves - Overall Cost Leadership.

Unit-V: Market Structure and Pricing Practices

Features and Types of different Competitive Situations - Price-Output Determination in Perfect Competition - Monopoly - Monopolistic Competition and Oligopoly - both the long run and short run. Pricing philosophy

REFERENCES:

- D. M. Mithani, Managerial Economics, HPH.
- Yogesh Maheshwari, Managerial Economics, PHI.
- Sumitrapal, Managerial Economics Cases & Concepts, Macmillan.
- H. Kaushal, Managerial Economics, Macmillan.
- Managerial Economics 'Craig H. Petersen, Pearson.
- D.N. Dwivedi, Managerial Economics, Vikas.

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MBA I YEAR I SEM

R18MBA03 FINANCIAL ACCOUNTING AND ANALYSIS

Course Aim:

- The aim of accounting is to provide the information that is needed for sound economic decision making. The main purpose is to provide information about firm's performance to external parties such as investors, creditors, bankers, researchers and Government Agencies.

Learning Outcome:

- To prepare, understand, interpret and analyze financial statements with confidence.
- To appreciate and use financial statements as means of business communication.
- To use the analytical techniques and arriving at conclusions from financial information for the purpose of decision making.

Unit-I: Introduction to Accounting

Importance - Objectives - Principles. GAAP: Accounting Concepts and Conventions; Double Entry System - Recording Business Transactions - Classification of Accounts - Accounting Cycle - Users of Accounting Information.

Unit-II: The Accounting Process

Overview of Accounting Process. Books of Original Record: Journal - Ledger - Trial Balance - Classification of Capital and Revenue Expenses - Final Accounts with Adjustments. Cash Book and other Subsidiary books.

Unit-III: Depreciation and Shares and Debentures

Concept - Methods of Depreciation: their impact on measurement of business Accounting - Straight Line Method - Written Down Value Method (problems). Entries for Issue of shares - Forfeiture - Issue of shares at Discount and premium. Issue and Redemption of Debentures.

Unit-IV: Financial Analysis-I

Statement of Changes in Working Capital - Funds from Operations - Paid Cost and Unpaid Costs. Preparation and Analysis of Cash Flow Statement and Funds Flow Statement.

Unit-V: Financial Analysis-II

Analysis and Interpretation of Financial Statements from Investor and Company point of view - Horizontal Analysis and Vertical Analysis of Company Financial Statements. Liquidity – Leverage - Solvency and Profitability Ratios - Du Pont Chart - Accounting Standards Issued by ICAI-IFRS - Window Dressing and Limitations of Financial Statements. Accounting Packages: Importance - Uses - Introduction to Tally: Features.

REFERENCES:

- Dhanesh K.Khatri "Financial Accounting & Analysis", TMH, New Delhi.
- PK Jain and K.L. Narang, Kalyani Publications.
- Narayana Swamy, "Financial Accounting & Analysis" PHI.
- V.Rajasekharam "Financial Accounting & Analysis" Pearson Education, New Delhi.
- Ranjan Kumar Bal: "Financial Accounting & Analysis", S.Chand, New Delhi.
- Maheswari, Financial Accounting, IBH.

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MBA I YEAR I SEM

R18MBA04 STATISTICS FOR MANAGERS

Course Aim:

- The course aims to encourage thinking statistically. It will encourage you to develop your abilities to understand and use data. It is designed to equip managers with the skills to make effective use of data in the workplace, to develop expertise in a standard set of statistical and graphical techniques that will be useful in analysing data, and to learn to apply these techniques in a number of areas of management.

Learning Outcome:

- Appreciate that the collection and statistical analysis of data improves business decisions and reduces the risk of implementing solutions that waste resources and effort.
- Select and deploy the correct statistical method for a given data analysis requirement.
- Achieve a practical level of competence in building statistical models that suit business applications.
- Recognise, develop and distinguish between models for cross-sectional analysis at a single point in time and models for time series analysis at multiple points in time.

Unit-I: Introduction to Statistics

Overview - Origin and Development - Managerial Applications of Statistics - Statistics and the Branches of the Study - Statistics & Computers - Limitations of Statistics.

Unit-II: Measures of central Tendency

Mean - Median - Mode. Dispersion - Range Quartile Deviation - Mean Deviation - Standard Deviation and Co-efficient of Variation. Skewness: Karl Pearson Co-efficient of Skewness - Bowley's Co-efficient of Skewness - Kelley's co-efficient of skewness. Theory and problems, Discussion on Direct and Indirect Methods of Solving the Problems.

Unit-III: Tabulation

Univariate - Bivariate - Multivariate Data. Data Classification and Tabulation - Diagrammatic and Graphical Representation of Data. One Dimensional - Two Dimensional - Three Dimensional Diagrams and Graphs.

Unit-IV: Small Sample Tests

t-Distribution - Properties and Applications - Testing for One and Two Means - Paired t-test. Analysis of Variance: One Way and Two Way ANOVA (with and without Interaction).
Chi-Square distribution: Test for a specified Population variance - Test for Independence of Attributes.

Unit-V: Correlation and Regression Analysis

Correlation Analysis - Scatter Diagram - Positive and Negative Correlation - Limits for Coefficient of Correlation - Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Concept of Multiple and Partial Correlation. Regression Analysis: Concept - Least Square Method - Two Lines of Regression - Properties of Regression Coefficients. Time Series Analysis: Trend analysis - Free Hand Curve - Moving Averages.

REFERENCES:

- Levin R.I., Rubin S. David, "Statistics for Management", 2015, 7th Ed. Pearson.
- Beri, "Business Statistics", 2015, 1st Ed, TMH.
- Gupta S.C, "Fundamentals of Statistics", 2015, 6th Ed. HPH.
- Amir D. Aczel and Jayavel Sounder pandian, "Complete Business Statistics", TMH,
- Levine, Stephan , Krehbiel , Berenson - Statistics for Managers using Microsoft Excel, PHI.
- J. K Sharma, "Business Statistics", 2015, Pearson.

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MBA I YEAR I SEM

R18MBA05 BUSINESS ENVIRONMENT & BUSINESS LAWS

Course Aim:

- To make students understand different types of business environments they should review before taking managerial decisions. To enable students understand legal and regulatory framework for doing business in India.

Learning Outcome:

- To understand the issues related to the industrial policy and regulation and their amendments from time to, time. The knowledge gained by the students on capital markets, GST, FDI, RBI guidelines; trade, EXIM policy and Foreign Exchange Management Act will be useful for them to take decisions to ensure growth and sustainability of the organizations.
- To understand the formalities involved in incorporating a company and the nuances related to the Law of Contract. To know various acts and their implications.

Unit-I: Introduction to Business Environment

Macro Environment Analysis (PESTEL Model). Industrial Policies: A Brief Review of Industrial Policies since Independence - Industrial Policy of 1991 and recent developments - Fiscal Policy - Monetary Policy. Latest Union Budget: Tax Implications - Goods & Services Tax (GST)

Unit-II: India's Trade Policy

Policy Changes and Issues - Sector Wise Trade Policies - Recent Developments - GATT - WTO - Agreements and Implications. Disinvestment: Meaning and its Policy with regard to Public Sector - Multi-National Companies and FDI.

Unit-III: EXIM Policies & FEMA

India's New EXIM Policy - Legal Framework - Initiatives - FEMA - Liberalisation - Privatisation - Globalisation and its impact on Indian Economy.

Unit-IV: Introduction to Business Law

Nature of Contract and Essential Elements of Valid Contract - Negotiable Instruments Act (1881) - Promissory Note - Bills of Exchange & Cheque - and their Definitions and Characteristics - Types of Endorsements - Consumer Protection Act (1986) - Income Tax Act (1961) - Information Technology (IT) Act (2000).

Unit-V: Companies Act-1956

Steps and Procedure for Incorporation of the Company. Company Management: Appointment of Directors - Powers - Duties & Liabilities of Directors. Company Meetings – Resolutions - Winding-up of a Company - Latest Amendments. New Regulations in Companies Act (2013).

REFERENCES:

- Justin Paul, "Business Environment: Text & Cases" TMH.
- Francis Cherunilam, "Business Environment: Text & Cases", HPH.
- K. Aswathappa, Essentials of Business Environment, Himalaya Publication House.
- RSN Pillai, Bagavathi, Business Law, S. Chand.
- N. D. Kapoor, Mercantile Law, Sultan Chand & Sons, latest edition
- S. S. Gulshan, Mercantile Law, 2/e, Excel Books, latest edition

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MBA I YEAR I SEM

R18MBA06 INFORMATION TECHNOLOGY FOR MANAGERS

Course Aim:

- It helps the students to enhance the knowledge in system applications and to be a technical expertise in domain.
- To create the awareness of technology impact in decision making and its significance in business management.

Learning Outcome:

- It provides basic knowledge about software which can aid to advance student's presentation skills by using technological tools like MS-Word, MS-Excel and MS-PowerPoint.
- To understand the flow of information through various network systems for better communication, usage of Smart tools and applications in recent trends.

Unit-I: Software Concepts

Types of software - Software: its Nature and Qualities - Operating Systems - Features of Microsoft Windows and Linux.

Unit-II: MS Office- Applications

MS Word in Business Correspondence: Letters - Tables - Mail Merge - Labels.
Applications of MS Excel: Graphs and Charts - Calculation of Various Financial Functions.

Unit-III: MS Power Point

Introduction: Toolbar - their Icons and Commands - Navigating in Power Point - Creation of Slides - Animation - Templates - Designing Presentations - Slide Show Controls - Making Notes on Pages and Handouts - Printing Presentations - Customizing Presentations - Auto Content Wizard.

Unit-IV: Computer Networks

Overview of Network - Communication Processors - Communication Media - Types of Network - Network Topologies - Network Protocols - Network Architecture. Recent developments.

Unit-V: Smart Tools & Apps

Mobile Banking - Smart Cards - Pay TM - On-line payment Apps - Knowledge and Information Sharing Apps - Digitisation - IOT - Hot Spot - Cloud based Services - Big Data Analytics features.

REFERENCES:

- Sanjay Saxena and Prathpreet Chopra, Computer Applications in Management, Vikas.
- Aksoy, Introduction to Information Technology, Cengage, ND
- Parameswaran: Computer Application in Business – S Chand, New Delhi.
- PS Gill, Database Management Stystems, IK Int Pub House, New Delhi
- Management Information Systems by D.P. Goyal, MacMillan Publishers.
- Sudalaimuthu & Anthony Raj, Computer Applications in Business, Himalaya, Mumbai

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MBA I YEAR I SEM

R18MBA07 CROSS CULTURE MANAGEMENT

Course Aim:

- The objective of the course is to help students to construct their own coherent, individual perspective of the substance and increase their cultural awareness.
- It focuses on interpersonal approaches between people of different cultures in work settings as opposed to a country specific approach.

Learning Outcome:

- The students are able to understand the significance of cross-cultural management, and of the major theoretical and empirical studies which examine the impact of different national cultures on work and employment.
- To know the international management practices and how organizational and national culture impacts upon them: work, motivation, performance appraisal, leadership, cross-cultural communication and decision-making, negotiation and trust, conflict and dispute resolution and corporate social responsibility.

Unit-I: Introduction

Determinants of Culture - Facets of Culture - Levels of Culture - National Cultural Dimensions in the Business Context - The influence of National Culture on business culture.

Unit-II: Cultural Dimensions and Dilemmas

Value Orientations and Dimensions - Reconciling Cultural Dilemmas - Culture and Styles of Management: Management Tasks and Cultural Values.

Unit-III: Culture and Organizations

Culture and Corporate Structures - Culture and Leadership - Culture and Strategy - Cultural Change in Organizations.

Unit-IV: Culture and Communications

Business communication across cultures - Barriers to Inter-cultural Communication - Negotiating Internationally.

Unit-V: Cross Cultural Team Management

Working with International Teams - Conflicts and Cultural Difference - Understanding and Dealing with Conflicts - Developing Inter-cultural Relationships.

REFERENCES:

- Marie-joelle Browaeys and Roger Price: Understanding CCM, Pearson.
- David C.Thomas: Cross Cultural Management, 2/e, Sage Publications.
- Nigel Holdon, CCM: Knowledge Management Perspective, Pentice Hall.
- Parissa Haghirian: Multinational and Cross Cultural Management, Routledge.
- Richard Mead: International Management-Cross cultural Dimension, 3/e, Blackwell.
- Jerome Dumetz -Cross-cultural management REFERENCES: Lessons from the world leading experts in cross-cultural management, Create Space Independent Publishing Platform; Student edition (September 5, 2012), Oakland, USA.

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MBA I YEAR I SEM

R18MBA08 INNOVATION MANAGEMENT

Course Aim:

- To equip the future entrepreneurs with an understanding of main issues in the management of innovation and technology

Learning Outcome:

- Students will be able to understand how technological innovation drives the long term competitiveness of Global organizations.

Unit-I: Innovation and Creativity

Introduction - Concern for Innovation - Concept of Innovation - Characteristics of Innovation - Components of Innovation - Sources of Innovation - Types of Innovation. Creativity: Creativity Process - Impact of Innovation.

Unit-II: Innovation Management

Concept of Innovation Management - Systems Approach - Evolution of Innovation Management - Importance of Management of Innovation - Effective Innovation Management - Performance Evaluation - Models of Innovation.

Unit-III: Strategizing Innovation

Innovation as a Strategy Component - Developing Innovation Strategy - Market Standing based on Strategy - Environment based strategy.

Unit-IV: Technology Management

Definition - Components - Features - Classification of Technology - Concept of Technology Management - Nature of Technology Management - Drivers of MOT - Significance - Scope of MOT - Technological Challenges.

Unit-V: Technology Change and Forecasting

Importance of Technological Change - Theories of Technological Change - Categories of Technological Change - Technological Intelligence - Technological Forecasting for Decision Making - Process of Technological Forecasting - Forecasting Techniques.

REFERENCES:

- C.S.G. Krishnamachayulu, R.Lalitha, Innovation Management, Himalaya Publishing House.
- Shlomo Maital, D.V.R.Sheshadri, Innovation Management, Division of Sage Publications.
- Bhattacharya P.S(1982), Creativity in Education, National psychological Corporation, Agra
- Silk, Leonard S(1963, Research resolution Mcgrawhill, Newyork.
- Paul Trott, Innovation Management and New Product Development, 5th Edition, Prentice Hall
- Tony Davila, Marc Epstein, and Robert Shelton, Making Innovations Work: How to Manage It, Measure It, and Profit from It.

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MBA I YEAR I SEM

R18MBA09 DISASTER MANAGEMENT

Course Aim:

- Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities. Understand the four work objectives of the disaster manager.
- They Know the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful.

Learning Outcome:

- After completing this session, you will be able to affirm the usefulness of integrating management principles in disaster mitigation work.
- They can distinguish between the different approaches needed to manage pre- during and post- disaster periods.

Unit-I: **Introduction to Disaster Management**

Definition - Nature - Types and Magnitude. Factors and Significance - Difference between Hazard and Disaster - Natural and Manmade Disasters

Unit-II: Consequences of Disasters and Hazards

Economic Damage - Loss of Human and Animal Life - Destruction of Ecosystem. Pre-Disaster Management - Early Warning and Prediction Systems: Role of IT - RS - GIS - GPS and ICS.

Unit-III: **Global Perspective (Natural Disasters)**

History of Disasters and Types of Hazards: Earthquakes - Volcanisms - Cyclones - Tsunamis - Floods - Droughts and Famines - Landslides & Avalanches.

Unit-IV: Global Perspective (Man-Made Disasters)

Study of Environmental Impacts Induced By Human Activity - Nuclear Reactor Meltdown - Industrial Accidents - Oil Slicks and Spills - Outbreaks of Disease and Epidemics - War and Conflicts.

Unit-V: Disaster Management and Planning

Post Disaster Management Planning: Management of Essential Supplies and Temporary Shelter Relief - Evacuation & other Logistic Management - Site Management - Medical Trauma and Stress Management - Integrated Developmental Planning For Disaster Management.

REFERENCES:

- Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
- Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
- Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
- Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
- Government of India, 1997, Vulnerability Atlas of India, New Delhi.
- Sahni, Pardeep Et.Al. (Eds.) 2002, Disaster Mitigation Experiences and Reflections. Prentice Hall Of India, New Delhi.

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MBA I YEAR I SEM

R18MBA10 BUSINESS COMMUNICATION & SOFT SKILLS

Course Aim:

- To enable students understand how to write business letters and improve written communication.

Learning Outcome:

- At the end of the course, students will be enabled with the following skills. English language skills for effective written business communication ('s). Will be able to understand how to write project report.

Unit-I: Business Writing

Introduction - Importance of Written Business Communication - Direct and Indirect Approached to Business Messages - Five Main Stages of Writing Business Messages. Practice Exercises.

Unit-II: Business Correspondence

Introduction - Business Letter Writing - Effective Business Correspondence - Common Components of Business Letters - Strategies for Writing the Body of a Letter - Kinds of Business Letters - Writing Effective Memos. Practice Exercises.

Unit-III: Instructions

Introduction - Written Instructions - General Warning - Caution and Danger - Format in Instructions - Oral Instructions - Audience Analysis - Product Instructions. Practice Exercises.

Unit-IV: Business Reports and Proposals

Introduction - What is a Report? - Steps in Writing a Routine Business Report - Parts of a Report - Corporate Reports - Business Proposals.

Unit-V: Careers and Resumes

Introduction - Career Building - Understanding Yourself - Setting a Career Goal - Job Search: Looking at Various Options - Preparing Your Resume - Resume Formats – Traditional - Electronic and Video Resumes - Online Recruitment Process. Write your resume to market yourself.

REFERENCES:

- Meenakshi Raman and Prakash Singh, Business Communication, Oxford.
- Lesikar: Basic Business Communication, TMH.
- David Irwin: Effective Business Communications, Viva-Thorogood.
- Rajendra Pal, J S KorlahaHi: Essentials of Business Communication: Sultan Chand & Sons, New Delhi.
- Business English Dictionary, Pearson.
- Lehman and Dufrene Sinha, BCOM (Business Communication), 2nd edition,Cengage.

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MBA I YEAR II SEM

R18MBA11 HUMAN RESOURCE MANAGEMENT

Course Aim:

- To understand various terms in HRM and be able to manage the human resources of an organization effectively and efficiently.

Learning Outcome:

- Students should be able to understand the basic HR concepts. They will be able to understand the process of recruitment, selection, performance appraisal, training & development, compensation and employee retention approaches and strategies.

Unit-I: Introduction of HRM

Introduction to HRM: Functions - Objectives - HRP-Need and Process - Job Analysis - Process - Job Description and Job Specification - Job Design: Techniques - Trends in HRM - Contemporary Issues.

Unit-II: Recruitment and Selection

Sources of Recruitment - Selection Process - Types of Selection Tests - Basic types of Interviews - Errors in Interviews - Induction - Placement.

Unit-III: Human Resource Development

Performance Appraisal - Process - Methods - Training - Procedure - On the Job & Off the Job Methods - Management Development Methods - Career Management.

Unit-IV: Compensation Management

Objectives - Factors - Job Evaluation - Methods - Components of Salary in India - Wage & Salary Administration - Fringe Benefits.

Unit-V: Industrial Relations Management

Nature - Parties to IR - Trade Unions - Factors affecting Unionism - Industrial Disputes - Settlement Methods - Collective Bargaining - Grievance Handling Procedure - Labour Legislation in India.

REFERENCES:

- Gary Dessler, “Human Resource Management”, 12th Edition, Pearson.
- K. Aswathappa, “Human Resource Management, Text and Cases”, TMH.
- Dr. Anjali Ghanekar, “Essentials of Human Resource Management”, Everest.
- Wayne. F.Cascio, Ranjeet Nambudiri, “Managing Human Resource Management”, 8th Edition, TMH.
- V S P Rao, “Human resource Management Text and Cases”, Excel Books.
- Chris Rowley and keith Jackson, Human Resource Management, Routledge.

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MBA I YEAR II SEM

R18MBA12 FINANCIAL MANAGEMENT

The students need Discounting Table and Annuity tables for the examination

Course Aim:

- To give an overview of the problems facing a financial manager in the commercial world. It will introduce you to the concepts and theories of corporate finance that underlie the techniques that are offered as aids for the understanding, evaluation and resolution of financial manager's problems.

Learning Outcome:

- Provides support for decision making. It enables managers to monitor their decisions for any potential financial implications and for lessons to be learned from experience and to adapt or react as needed.
- To ensure the availability of timely, relevant and reliable financial and nonfinancial information. FM helps in understanding the use of resources efficiently, effectively and economically.

Unit-I: The Finance Function

Nature and Scope - Evolution of Finance Function - It's New Role in the Contemporary Scenario - Goals of Finance Function - Maximizing vs. Satisfying - Profit vs. Wealth vs. Welfare - The Agency Relationship and Costs - Risk-Return Trade Off - Concept of Time Value of Money - Future Value and Present Value and the Basic Valuation Model.

Unit-II: The Investment Decision

Investment Decision Process: Project Generation - Project Evaluation - Project Selection and Project Implementation. Developing Cash Flow - Data for New Projects.

Capital Budgeting Techniques: Traditional and DCF methods - The NPV vs. IRR Debate.

Cost of Capital: Concept and Measurement of Cost of Capital - Debt vs. Equity - Cost of Equity - Preference Shares - Equity Capital and Retained Earnings - Weighted Average Cost of Capital and Marginal Cost of Capital. Importance of Cost of Capital in Capital Budgeting Decisions.

Unit-III: Capital Structure Decisions

Capital Structure vs. Financial Structure: Capitalization - Financial Leverage - Operating Leverage and Composite Leverage. EBIT-EPS Analysis - Indifference Point/Break Even Analysis of Financial Leverage. Capital Structure Theories: The Modigliani Miller Theory – Net Income - Net Operating Income Theory and Traditional Theory - A Critical Appraisal.

Unit-IV: Dividend Decisions

Major Forms of Dividends - Cash and Bonus Shares. Dividends and Value of the Firm:

Relevance of Dividends - The MM Hypothesis - Factors Determining Dividend Policy - Dividends and Valuation of the Firm - The Basic Models. Major Theories centred on the works of GORDON, WALTER and LITNER.

Working Capital Management: Components of Working Capital - Gross vs. Net Working Capital - Determinants of Working Capital Needs - The Operating Cycle Approach. Planning of Working Capital - Financing of Working Capital through Bank Finance and Trade Credit - Recommendations of Tandon and Daheja Committee on Working Capital.

Unit-V: Management of Current Assets

Management of Cash: Basic Strategies for Cash Management - Cash Budget - Cash Management Techniques/Processes. Management of Receivables and Management of Inventory.

REFERENCES:

- IM Pandey, Financial Management, 10th Edition, Vikas.
- M.Y Khan, P K Jain: "Financial Management-Text and Problems", 6th Edition, TMH.
- Prasanna Chandra, "Financial Management Theory and Practice", 8th Edition, TMH.
- Shashi K. Gupta, R. K. Sharma, "Financial Management" Kalyani Publishers.
- Rajiv Srivastava, Anil Mishra, Financial Management" Oxford University Press, New Delhi.
- James C Van Horne, Sanjay Dhamija, "Financial Management and Policy" Pearson Education.

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MBA I YEAR II SEM

R18MBA13 MARKETING MANAGEMENT

Course Aim:

- The objective of this course is to introduce students to the concepts, analysis, and activities that comprise marketing management. This course is also foundation for advanced electives in marketing.

Learning Outcome:

- They will be able to analyze markets and design customer driven strategies and will be able to communicate the decisions towards business development with superior customer value.

Unit-I: Introduction to Marketing

Importance - Scope of Marketing - Core Marketing Concepts - Marketing Environment - Marketing Strategies & Plans. Market Research: Definition of MR - MIS - MR Process - MR Online - MR & Ethics - International MR.

Unit-II: Analyzing Marketing Opportunities, Customer Value and Marketing Mix

Consumer Decision Making - Creating Customer Value - Analyzing Consumer Markets - Consumer Behaviour - Cultural - Social & Personal Factors - Developing Products & Brands - Product Levels - Classifying Products - Product Range - Line & Mix - PLC - New Product Development.

Unit-III: Designing a Customer Driven Strategy

Market Segmentation: Segmentation of Consumer Market - Business Market - Requirement for Effective Segmentation - Market Targeting - Evaluating Market Segmentation - Selecting Target Market Segmentation - Positioning: Positioning Maps - Positioning Strategy.

Unit-IV: Distribution Decisions, Promotion & Communication Strategies

Marketing Channels - Channel Intermediates and Functions - Channel Structure - Channel for Consumer Products - Business and Industrial Products - Alternative Channel - Channel Strategy Decisions. The Promotional Mix - Advertising - Public Relations - Sales Promotion - Personal Selling - Marketing Communication - Communication Process - Communication Promotion Mix - Factors affecting the Promotion Mix.

Unit-V: Pricing Theory and Practices & Different Types of Marketing

Importance of Price - Cost Determinant of Price - Mark-up Pricing - Profit Maximization Pricing - Break Even Pricing - Pricing Strategy - Ethics of Pricing Strategy - Product Line Pricing - WOM - Rural Marketing - BOP - Relationship Marketing - Digital Marketing - Social Marketing - Retail Management - Services Marketing - Global marketing.

REFERENCES:

- Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithleshwar Jha: Marketing Management, 13/e, Pearson Education.
- Ramaswamy Namakumari, “Marketing Management”, TMH Edition.
- Paul Baines, Chris fill, Kelly Page, Piyush Sinha, Marketing, Asian Edition, Oxford.
- Czinkota Kotable “Marketing Management” Indian Edition, Cengage learning.
- S.A.Sherlekar, R.Krishnamoorthy, Marketing Management concept and cases, HPH.
- Rajendra P.Maheswari, Marketing Management (Text & Cases) an Indian Perspective, IBH.

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MBA I YEAR II SEM

R18MBA14 QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

Course Aim:

- To provide the basic tools of Operations research in solving the management problems using mathematical approach for decision making.

Learning Outcome:

- The Course covers origin and application of OR, Linear Programming, Decision Theory, Game theory and PERT &CPM. These concepts help the student in taking decisions for business.

Unit-I: Nature and Scope of Operations Research

Origins of OR - Applications of OR in different Managerial Areas - Defining a Model - Types of Model - Process for Developing an Operations Research Model - Practices - Opportunities and Short Comings of using an OR Model.

Unit-II: Linear Programming Method

Structure of LPP - Assumptions of LPP - Application Areas of LPP - Guidelines for Formulation of LPP - Formulation of LPP for different Areas - Solving of LPP by Graphical Method - Extreme Point Method - ISO-cost Profit Method - Simplex Method - Two Phase Method - Big-M Method - Converting Primal LPP to Dual LPP - Limitations of LPP.

Unit-III: Transportation Problem and Assignment Model

Mathematical Model of Transportation Problem - Methods for finding Initial feasible solution: Northwest Corner Method - Least Cost Method - Vogel's Approximation Method - Test of Optimality by Modi Method - Variation Transportation - and Problems like Unbalanced Supply and Demand - Degeneracy and its Resolution. Algorithm for Solving Assignment Model: Hungarian Method for Solving Assignment Problem - Variations of Assignment Problem: Multiple Optimal Solutions - Maximization Case in Assignment Problem - Unbalanced Assignment Problem - Travelling Salesman Problem.

Unit-IV: Game Theory and Decision Theory

Introduction: Two Person Zero-Sum Games - Pure Strategies - Games with Saddle Point - Mixed Strategies - Rules of Dominance - Solution Methods of Games without Saddle Point: Algebraic - Matrix - and Arithmetic Methods. Introduction to Decision Theory: Ingredients of Decision Problems. Decision Making: Under Uncertainty - Cost of Uncertainty - Under Risk - Under Perfect Information. Decision Tree: Construction of Decision Tree

Unit-V: PERT & CPM

Drawing Networks - Identifying Critical Path - Probability of Completing the Project within given Time - Project Crashing - Optimum Cost and Optimum Duration.

REFERENCES:

- J. K. Sharma, "Operations Research: Theory and applications, 5th Edition, McMillan.
- V. K. Kapoor, "Operations Research: Quantitative Techniques for Management", Sultan Chand & Sons.
- Anand Sharma, "Quantitative Techniques for Decision Making", HPH.
- L C Jhamb, Quantitative Techniques, Everest.
- C.R. Kothari, Quantitative Techniques, Revised edition, Vikas.
- N. D. Vohra, Quantitative Techniques in Management, TMH.

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MBA I YEAR II SEM

R18MBA15 PRODUCTION AND OPERATIONS MANAGEMENT

Course Aim:

- To introduce concepts of production and operations management in an organization and expose to analytical methods.

Learning Outcome:

- The students will be able to understand operations management, product & process design, analysis, plant location, layout, Scheduling and Material Management.

Unit-I: Introduction to Operations Management

Functional Subsystems of Organization - Definition - Systems Concept of Production. Types of Production Systems: Flow Shop - Job Shop - Batch Manufacturing - The Project – Productivity. Strategic Management: Corporate Strategic - Generic Competitive Strategies - Functional Strategies - Gross Domestic Product and its impact - World Class Manufacturing.

Unit-II: Product & Process Design and Analysis

Product Design and Analysis (Definition) - New Product Development - It's Concepts - Steps of Product Design. Process Planning and Design: Selection of Process - Process Selection Decision - Process Planning Design - Responsibilities of Process Planning Engineer - Steps in Process Planning. Process Design - Process Research. Work Study - Method Study and Work Measurement. Value Analysis/Value Engineering: History of Value Analysis/Value Engineering - When to Apply Value Analysis - Function - Aims - Value Engineering Procedure - Advantages and Application Areas. Standardization: Standardization Procedure - Advantages of Standardization - Application of Standardization. Ergonomic Considerations in Product Design.

Unit-III: Plant Location & Plant Layout

Factors Influencing Plant Location - Break-even Analysis. Single Facility Location Problem - Multi-facility Location Problems - Model for Multi-facility Location Problem - Method of Transformation - Model to Determine X- Coordinates of New Facilities - Model to Determine Y-Coordinate. Introduction to Plant Layout - Classification of Layout - Advantages and Limitations of Product Layout - Advantages and Limitations of Group Technology Layout - Layout Design Procedures.

Unit-IV: Scheduling

Introduction - Johnson's Problem - Extension of Johnson's rule. Job Shop Scheduling: Introduction - Types of Schedules - Schedule Generation - Heuristic Procedures. Two Jobs and Machines Scheduling.

Unit-V: Materials Management

Components of Integrated Materials Management: Materials Planning - Inventory Control - Purchase Management - Stores Management. Inventory Control: Inventory Decisions - Costs Trade Off. Models of Inventory - Operation of Inventory Systems - Quantity Discount - Implementation of Purchase Inventory Model - Purchasing Management.

Stores Management: Incoming Materials Control - Store Accounting - Obsolete Surplus and Scrap Management - ABC Analysis - XYZ Analysis - VED Analysis - FSN Analysis - SDE Analysis. Computer Aided Techniques in POM.

REFERENCES:

- Panneerselvam, “Production and Operations Management” PHI.
- Ajay K Garg, Production and Operations Management, TMH.
- Prof. L.C. Jhamb: Production Operations Management, 18th edition, Everest Publishing House.
- Dipak Kumar Bhattacharyya, Production and Operations Management, Universities Press.
- B. Mahadevan, Operations Management: Theory and Practice, Pearson.
- Kenneth K. Boyer, Rohit Verma, Operations Management: Cengage Learning.

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MBA I YEAR II SEM

R18MBA16 BUSINESS ETHICS & CORPORATE GOVERNANCE

Course Aim:

- To inculcate the need for business ethics to ensure sustained business stability.

Learning Outcome:

- The students will be able to understand ethical and psychological dimensions to contain cyber crimes and also will be able grasp the important issues related to corporate governance.

Unit-I: Business Ethics the Changing Environment

Business Ethics Introduction - Levels of Business Ethics - Five Myths about Business Ethics - Can Business Ethics be Taught and Trained? - Stages of Moral Development - Kohlberg's Study - Carol Gilligan's Theory - Principles of Ethics.

Unit-II: Professional Ethics

Ethical Dilemma: Introduction - Dilemma and Ethical Dilemma - Mounting Scandals - Ethical Issues. Preparatory Ethics: Proactive Steps - Ethics in Production and Production Management - Ethics of Marketing Professionals - Ethics in HRM - Ethics of Finance and Accounting Professionals.

Unit-III: Cyber Crimes

Cyber Crimes and Cyber Terrorism - Social - Political - Ethical and Psychological - Dimensional - Intellectual Property in the Cyberspace - Ethical Dimensions of Cyber Crimes - The Psychology - Mindset & Other Cyber Criminals - Sociology of Cyber Criminals - Information Warfare.

Unit-IV: Corporate Governance-I

Does Good Governance Really matters to Corporations? - Importance of Corporate Governance - Corporate Governance in India - Board Structures Processes and Evaluation - Director Independence - Board Committees - Indian Model of Corporate Governance.

Unit-V: Corporate Governance-II

Information Communication and Disclosure - Irani Committee Report - OECD Principles of Corporate Governance - Risk - Internal Control and Assurance - Banks and Corporate Governance.

REFERENCES:

- SK Mandal: Ethics in Business and Corporate Governance, TMH.
- C. S. V. Murthy: Business Ethics, Himalaya Publishing House.
- Nina Godbole & Sunit Belapure "Cyber Security" Wiley India.
- Geethika, RK Mishra, Corporate Governance Theory and Practice, Excel.
- Dr. S. S. Khanka, Business Ethics and Corporate Governance, S. Chand.
- Khanka, Business Ethics and Corporate Governance, S. Chand.

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MBA I YEAR II SEM

R18MBA17 MANAGEMENT INFORMATION SYSTEMS & ERP

Course Aim:

- To enable students on importance of information systems in the decision making and management of organizations, the foundations of Enterprise planning and ERP System Options.

Learning Outcome:

- The students will understand the MIS concepts its applications, challenges in implementation of ERP system, ERP System Implementation options, and functional modules of ERP

Unit-I: Introduction

MIS Importance - Definition - Nature and Scope of MIS - Structure and Classification of MIS - Information and Systems Concept - Types of Information - Information Systems for Competitive Advantage.

Unit-II: Business Applications of Information Systems

E-Commerce - ERP Systems – DSS - Business Intelligence and Knowledge Management System.

Unit-III: Management of Information Systems

Information System Planning - System Acquisition - Systems Implementation - Evaluation & Maintenance of IS - IS Security and Control. Global Perspective on Cybercrime - Cybercrime era.

Unit-IV: Introduction to ERP

Foundation for Understanding ERP systems - Business benefits of ERP - The Challenges of Implementing ERP System - ERP Modules and Historical Development.

Unit-V: ERP - Sales and Marketing

Management Control Process in Sales and Marketing - ERP Customer Relationship Management - ERP Systems - Accounting & Finance Control Processes. Financial Modules in ERP Systems.

REFERENCES:

- D P Goyal, Management Information Systems–Managerial Perspective, MacMillan.
- Laudon & Laudon, Management Information Systems, Pearson.
- Jawadekar, MIS Text and Cases, TMH.
- Mary Sumner “Enterprise Resource Planning” Pearson.
- Ellen Monk “Enterprise Resource Planning” Cengage.
- Goyal “Enterprise Resource Planning” TMH.

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MBA I YEAR II SEM

R18MBA18 INTELLECTUAL PROPERTY RIGHTS

Course Aim:

- The objective of this course is to provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.

Learning Outcome:

- It allows students how to prepare and protect the Inventions , start up ideas and rights of patents and copy rights etc.,
- This subject brings awareness to the students the basic legal aspects at present following at Global level.

Unit-I: Introduction

Intellectual Property Rights Basics - The Role and Value of IP in International Commerce - Issues affecting IP Internationally. Agreement on Trade related Aspects of Intellectual Property Rights (TRIPS) - Agreement on TRIPS and India.

Unit-II: Parties to IP Rights

Owner - Customer - Authorized User - Licensee - Attorney - Protection of the Weak and Strong - Finalizing Ownership and Use Rights.

Unit-III: Ensuring the Value of IP

Ensuring the Value of IP at Creation Stage - After Creation Stage - Precise Contractual Protection of IP rights. Key Issues related to IP Internationally. IP Rights in International Forums. Fundamentals in Country Legal Systems - Generalities. Validity of IP Rights Locally: Specifics.

Unit-IV: Managing IP Rights

Acquiring IP Rights: Letters of Instruction - Joint Collaboration Agreement - Work made for Hire Agreement. Protecting IP Rights: Non Disclosure Agreement - Cease and Desist Letter - Settlement Memorandum. Transferring IP Rights: Assignment Contract - License Agreement - Deed of Assignment or License Agreement - Addendum to Unrecorded Assignment or License.

Unit-V: Remedies

Remedies and IPR Evaluation - GATT - WTO - Role of WTO in Solving IPR Issues.

REFERENCES:

- Karla C. Shippey, A short course in International Intellectual Property Rights, World Trade Press – 2nd Edition.
- A. Subbian, Intellectual Property Rights - Heritage, Science, & Society under international treaties, Deep & Deep Publications, New Delhi.
- Intellectual Property Rights: N K Acharya: ISBN: 9381849309
- Intellectual Property Rights: C B Raju : ISBN-8183870341
- Stephen M McJohn, Intellectual Property : Examples and Explanation
- Keith E Maskus, Intellectual Property Rights in the Global Economy, PIIE

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MBA I YEAR II SEM

R18MBA19 ENTREPRENEURSHIP

Course Aim:

- The aim of this subject is to inspire students to become entrepreneurs so that they will emerge as job providers rather than job seekers.

Learning Outcome:

- By the end of this course the students should be able to understand the mindset of the entrepreneurs, identify ventures for launching, develop an idea on the legal framework and also understand strategic perspectives in entrepreneurship.

Unit-I

Understanding Entrepreneurial Mindset - The Revolution Impact of Entrepreneurship - The Evolution of Entrepreneurship - Approaches to Entrepreneurship - Process Approach - Twenty First Century Trends in Entrepreneurship.

Unit-II

The Individual Entrepreneurial Mindset and Personality - The Entrepreneurial Journey - Stress and the Entrepreneur - The Entrepreneurial Ego - Entrepreneurial Motivations. Corporate Entrepreneurial Mindset - The Nature of Corporate Entrepreneur - Conceptualization of Corporate Entrepreneurship Strategy - Sustaining Corporate Entrepreneurship.

Unit-III

Launching Entrepreneurial Ventures - Opportunities Identification - Entrepreneurial Imagination and Creativity - The Nature of the Creativity Process - Innovation and Entrepreneurship. Methods to Initiate Ventures - Creating New Ventures - Acquiring an Established Entrepreneurial Venture - Franchising - Hybrid Disadvantage of Franchising.

Unit-IV

Legal Challenges of Entrepreneurship - Intellectual Property Protection - Patents - Copyrights - Trademarks and Trade Secrets - Avoiding Trademark Pitfalls. Formulation of the Entrepreneurial Plan - The Challenges of New Venture Start-ups - Poor Financial Understanding - Critical Factors for New Venture Development - The Evaluation Process - Feasibility Criteria Approach.

Unit-V

Strategic Perspectives in Entrepreneurship - Strategic Planning - Strategic Actions - Strategic Positioning - Business Stabilization - Building the Adaptive Firms - Understanding the Growth Stage - Unique Managerial Concern of Growing Ventures.

REFERENCES:

- Vasant Desai, “Small Scale industries and entrepreneurship”, Himalaya Publishing.
- Rajeev Roy, “Entrepreneurship”, 2e, Oxford.
- B.Janakiram and M.Rizwana” Entrepreneurship Development: Text & Cases, Excel Books.
- Stuart Read, Effectual Entrepreneurship, Routledge.
- Robert Hisrich et al “Entrepreneurship” 6th e, TMH.
- Nandan H, Fundamentals of Entrepreneurship, PHI.

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MBA I YEAR II SEM

R18MBA20 PERSONAL EFFECTIVENESS

Course Aim:

- To enable students to develop soft skills necessary for employability.

Learning Outcome: Students at the end of the course would be able to:

- Allow them to enhance in Oratory Skills and feel confident about them-selves.
- Participate in group discussions, face interviews.
- Gain communication skills and be able to convince their view point to the superiors, peers and subordinates.
- Time management skills to efficiently manage time in meeting deadlines in modern day organizations.
- Life style management skills to grow in modern day organization and succeed in their chosen careers.
- Help students to confidently face and succeed in the corporate selection processes.

Unit-I: Introduction to PE

Introduction to PE: Need - Scope - SWOT Analysis - Methods for Improvement - Impact of PE towards Job Market.

Unit-II: Communication

Communication: Basic English - Content Development - Techniques for Group Discussions - JAM Sessions - Debate.

Unit-III: Presentation Skills

Presentation - PPT Making - Analytical Skills - Demonstrative Methods - Writing Skills.

Unit-IV: Behavioural Techniques

Behavioural Techniques: Body Language - Attire - Oratory Skills - Personal Etiquette - Emotional Intelligence - Mental Checks & Balance.

Unit-V: Organising Skills

Role Efficacy - Corporate Roles & Responsibilities - Organising Yourself & Organising Others - Self Assessment Process

REFERENCES:

- Sherfeild, Developing Soft skills-Pearson Education.
- Murphy: Effective Business communication, TMH.
- Colin BEARD: Experiential Learning, Kogan Page.
- Anandamurugan, Placement Interview Skills for Success, TMH.
- Charles J. Given, Super Self: Doubling Your Personal Effectiveness
- Troels Richte, The 3 Pillars of Personal Effectiveness
- Stephen R. Covey, The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change
- BarunMitra, Personality Development and Soft skills

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MBA II YEAR I SEM

R18MBA21 STRATEGIC MANAGEMENT

Course Aim:

- To enable the students develop a holistic perspective about strategic management of an organization.

Learning Outcome:

- To understand how to scan internal and external environment of an organization, understand different types of strategies and structures, strategies of the competitors, turnaround strategies, global strategies and strategic control. With that knowledge they would be able to formulate strategies, change strategies if necessary and implement strategies.

Unit-I: Strategic Inputs

Introduction to Strategic Management - Strategic Management and Competitiveness - Technology and Technology Change - Vision, Mission and Objectives - Strategic Leaders - Strategic Management Process. The External Environment: Opportunities - Threats - Competition and Competitor Analysis - External Environmental Analysis - Segments of the External Environment - Porters 5 Force Model. The Internal Environment: Resource - Capabilities - Competencies and Competitive Advantages. Analyzing Internal Organization - Building Core Competencies - Value Chain Analysis - Outsourcing.

Unit-II: Formulation of Strategic Actions

Business Level Strategy - Effectively Managing Relationships with Customers - The Purpose of Business Strategy. Competitive Rivalry and Dynamics - A Model of Competitive Rivalry - Competitor Analysis - Drivers of Competitive actions and responses - Competitive rivalry and dynamics.

Unit-III: Corporate level Strategy

Levels of Diversifications and Reasons - Value Creating Diversifications. Strategic Acquisitions & Restructuring: Popularity of Mergers & Acquisitions Strategies - Problems in Achieving Acquisition Success - Restructuring.

Unit-IV: Global Strategy

Identifying International Opportunities and International Strategies - Strategic Competitive Outcomes and Risk in an International Environment. Corporate Implications for Strategy - Strategic Alliances - Corporate Level Cooperative Strategy - Competitive Risk with Cooperative Strategies.

Unit-V: Structure and Controls with Organizations

Organizational Structure and Controls - Evolutionary Patterns of Strategy and Organizational structure. Leadership Implications for Strategy - Entrepreneurial Implications for Strategy.

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- Mason A Carpenter et al.”Strategic Management: A dynamic Perspective” Pearson.
- Adrian & Alison” Strategic Management: Theory & Application” Oxford University Press.
- P. Subba Rao, Business Policy and Strategic Management, HPH.
- V.S.P. Rao, V. Hari Krishna; Strategic Management, Excel Books.
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MBA II YEAR I SEM

R18MBA22 RESEARCH METHODOLOGY

Course Aim:

- To understand the theoretical perspective of research methodology and basic statistical tools for analysis and interpretation of quantitative and qualitative data.

Learning Outcome:

- Students will be able to apply the principles of research methodology for the research design for the various mini and major projects of the MBA programme. They will be able to analyse the data statistically.

Unit-I: Research Methodology

Overview of Research Methodology: Research Problems - Types of Research - Research Process - Ethics in Business Research - Limitations of Social Science Research. Observation Studies and Research.

Unit-II: Design of Business Research

Research Design an Overview: Qualitative Research Vs Quantitative Research - Types of Research Design - Validity of Research Design - Types of Designs.

Unit-III: Data Collection Methods & Tools

Primary Data - Secondary Data - Designing Questionnaire and Schedule of Questions. Sampling Methods: Random - Non-Random Techniques – Tabulation - Interpretation and Analysis of Data.

Unit-IV: Measurement of Scaling Techniques

Introduction - Objectives - Qualitative Research Vs Quantitative Measures - Classification /Types of Measures - Characteristics of Instruments - Measurement of Scales - Errors in Measurement. Types of Scales - Techniques of Comparative and Non-comparative Scaling Techniques - Guidelines for Deciding Scales.

Unit-V: Report Writing & Bibliography

Introduction - Objectives - Format of a Report - Classification of the Report - Presentations of the Report - Synopsis Vs Main Report - Footnotes - Importance of Hypotheses and Objectives in Report Writing - Types of Reports - Report Format - Cover Page - Preliminary Pages - Main Body - Appendices and Bibliography - Importance of Excel and SPSS in Report Writing.

REFERENCES:

- Krishna Swamy, SIvakumar, Mathirajan - Management Research Methodology, Pearson
- R.Pannerselvam -Research Methodology-, PHI
- T N Srivatsava, Shailaja Rego -Business research Methods-TMH
- Business research Methods -Donald R cooper, Pamela S Schindler
- William.G. Zikmund- Business Research Methods, Thomson
- Business Research Methods-SL Gupta, Hitesh Gupta

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MBA II YEAR II SEM

R18MBA23 ANNUAL REPORT ANALYSIS-CASE STUDY

Approach: CMIE Prowess Database/ANNUAL REPORT OF COMPANIES & MS-Excel.

Course Aim:

- To show annual reports of different companies to students so that they use then knowledge gained in financial accounting and analysis and financial management for analysis of performance of the organizations on multiple dimensions.

Learning Outcome: By the end of this mini project, students will be able to:

- Analyse balance sheet of an organization.
- Analyse profit and loss of an organization.
- Analyse investment portfolio of the organization.
- Analyse profitability ratios, asset turnover ratios, structural ratios and liquidity ratios.
- Forecast the future gaps in terms changing objectives of the organization.

EXERCISES:

1. Analysis of profitability ratios.
2. Analysis of structural ratios.
3. Analysis of asset turnover ratios.
4. Analysis of liquidity ratios.
5. Analyse Growth, Stability and Stock Performance.

REFERENCES:

- Refer Books Under Financial Accounting and Analysis, Financial Management.

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MBA II YEAR II SEM

R18MBA24 BUSINESS BEST PRACTICES-CASE STUDY

Course Aim:

- To enable students to understand the best practices followed by the organizations.

Learning Outcome:

- By understanding the best practices through internet and interaction with the company executives, the students should be able to understand the best practices.
- By going through the works of the other classmates, the all students should be able to understand many of the best practices and also will be able to suggest the next practices.

The students may choose any of the following corporate practices or any other practices and study with reference to any company:

1. Balanced Score Card.
2. Benchmarking.
3. Career Planning
4. Competency Mapping
5. Capability Maturity Model
6. People Capability Maturity Model (Level 5)
7. Performance Management System
8. Six Sigma
9. Talent Management
10. Any other functional systems, policies, practices may also be considered for studying.

Report: A report of the best practice must be prepared with the help of the information available in the open source (example websites, news papers, business magazines). Formal or informal interaction with the managers of the organization may also be attempted to have better clarity.

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MBA II YEAR II SEM

R18MBA25 INNOVATIVE ENTREPRENEURSHIP-CASE STUDY

Course Aim:

- To understand how entrepreneurs are becoming successful. This is to inspire students to become job providers rather than job seekers.

Learning Outcome:

- After doing field visit to any small or big organization and after interacting with the entrepreneur and others in the organization, the students should be able to understand:

1. How to start a company?
2. How to choose the product and estimate demand for the product.
3. The problems of procurement of raw materials.
4. The marketing, HR and finance problems of the entrepreneur.
5. Growth alternatives available to the entrepreneur.

REPORT: A brief report of the understanding and observation should be submitted and presented in the class.

REFERENCES:

- Raj Shankar, Entrepreneurship Theory and Practice, TMH.
- A G Krishnamurthy, Dhirubhaism, TMH.

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MBA II YEAR II SEM

R18MBA26 PROJECT WORK & VIVA-VOCE

THE FINAL PROJECT IS DIVIDED IN TO STAGE-I, STAGE-II AND MAIN PROJECT REPORT AND VIVA.

Course Aim:

- Aim of multi stage evaluation is to enable students do original work on their own so that they can get the benefit in terms of gaining practical knowledge and possible employment.

Learning Outcome:

- After following the three stages mentioned below for doing project work students should be able to:

1. Develop research design for their topic of research.
2. Understand the data requirements and collect data relevant for their research.
3. Analyse data and interpret results.

Stage-I: RESEARCH METHODOLOGY (Chapter I of the Main Report)

Students should be advised to do final MBA projects on topics close to the job they prefer to do after MBA. The faculty should guide them and focus on the methodology of doing a project so that the students can understand how to study the problems they come across while working. The following is the suggested check list for doing STAGE I of the project.

Topic:
……

Chapter I
Brief Introduction:
Review of literature:
Research Gaps:
Research Questions:
Objectives of the study:
Hypotheses:
Scope of the study:
Period of the study:
Sample:
Data Collection:
Primary Data:
Secondary Data:

Stage-II: STATISTICAL ANALYSIS (Chapter II of the main report)
Approach: Students should collect data for the main project from CMIE Prowess DATABASE or any other source or from the field. Students are expected to use relevant statistical tools

using Excel, SPSS, MINI TAB, or R and make a Seminar Presentation. This will the CHAPTER II : Data Analysis of the main report.

Stage III: MAIN PROJECT REPORT AND VIVA (Chapter III of the Main Report).
In addition to the above two stages the students should write the third chapter on Data Interpretation, Conclusion & Suggestions and submit the final report by including the following.

REFERENCES:
Appendix I: Questionnaire (if any).
Appendix II: Definition of concepts, models, formulas used in the report.

NOTE: FACULTY SHOULD ADVISE STUDENTS TO GIVE ONLY REFERNCES TO THE WEBSITES AND JOURNALS AND NOT TO DIRECTLY DOWNLOAD IN THE PROJECT REPORT. MAXIMUM 30% CAN BE DOWNLOADED AND REST SHOULD BE ORIGINAL.

After the submission of the report by consolidating the work done in stage 1, 2 and 3, an external viva will be held by the University to give the grade as per the University guidelines.

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MBA II YEAR II SEM

R18MBA27 INTERNSHIP

Course Aim:

- To ensure that students are constantly evolving and prepared for the fast-paced Technology driven competitive world by working in any organization.
- Students should learn conceptual learning in real time business problems and also to develop personal leadership traits, team work, an insight into a Cross Cultural Environment and understanding organizational dynamics to be on par with industry requirements.

Learning Outcome:

- Students will be transformed into business leaders with a industry ready skill set.
- Students will be able to understand
  a) Management Functions and Organizational Structure
  b) Organizational Dynamics in Terms of Organizational Behaviour, Culture, Climate
  c) Functional Domain Knowledge
  d) Processes and Systems
  e) External and Internal Environment Impact on the Organization.

Approach to Internship:

- Students should take covering letter/s from the college, addressed to the organization/professional institutions during the beginning of the fourth semester coursework.
- The students in consultation with supervisor / mentor and head of the department should choose any area / topic of Business Management as per the Syllabus prescribed by the college.
- The students can approach any business organizations / corporate of both public and private sectors, Government departments, Research organizations etc. for the internship.
- The students should do the internship minimum for a period of 45 days.
- Internship Report has to be submitted to the department after approval by the concerned supervisor/mentor and the Head of the department for the Power Point (PPT) presentation for evaluation along with Semester end examinations.
- Internship Report is evaluated for 100 marks. The report has to be evaluated by the Head, Supervisor/ mentor and the senior faculty of the department.

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MBA II YEAR I SEM

R18MBA28 CONSUMER BEHAVIOUR
(Marketing Elective)

Course Aim:

- To study the consumer behaviour concept in order to develop better marketing programs and strategies.

Learning Outcome:

- The student will be able to evaluate the effectiveness of various consumer behaviour components such as perception, attitude, decision making, and marketing ethics.

Unit-I: Understanding Consumer Behaviour

Defining Consumer Behaviour - Why to study Consumer Behaviour? - Understanding Consumer through Research Process - Consumer Behaviour in a World of Economic Instability - Rural Consumer Behaviour. Consumer Segmentation - Targeting and Positioning. Segmentation & Branding - Rural Markets.

Unit-II: Environmental Influences on Consumer Behaviour

Influence of Culture - Sub Culture - Social Class - Social Group - Family and Personality. Cross-Cultural Consumer Behaviour.

Unit-III: Consumer as an Individual

Personality and Self-Concept: Consumer Motivation - Consumer Perception - Consumer Attitudes and Changing Attitudes - Consumer Learning and Information Processing.

Unit-IV: Consumer Decision Making Processes

Problem Recognition - Search and Evaluation - Purchasing Processes - Post Purchase Behaviour. Models of Consumer Decision Making. Consumers and the Diffusion of Innovations.

Unit-V: Consumerism and Ethics

Roots of Consumerism: Consumer Safety - Consumer Information - Consumer Responsibilities - Marketer Responses to Consumer Issues - Marketing Ethics towards Consumers.

REFERENCES

- David L. Loudon and Albert J.Della Bitta, Consumer Behaviour, TMH.
- S. Ramesh kumar, cases in Consumer Behaviour, Pearson.
- Suja R Nair, Consumer Behaviour in Indian perspective, HPH.
- Ramneek kapoor, N.Namdi O Madichie, Consumer Behaviour, TMH.
- Michael R.Solomon Consumer Behaviour, Tenth Edition, PHI.
- Ramanuj Majumdar, Consumer Behaviour, PHI.

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MBA II YEAR I SEM

R18MBA29 INTEGRATED MARKETING COMMUNICATIONS & SALES
(Marketing Elective)

Course Aim:

- The students are able to understand the principles and practices of marketing communications along with role of sales function used by mentors.

Learning Outcome:

- The student will understand the prospects of promotional mix along with maintenance of sales force, preparing and execution of sales budget.

Unit-I: Understanding Integrated Marketing Communication

Understanding Marketing Communication: Integrated Marketing Communication - Integrated Marketing Communication as an Integral part of Marketing. Understanding Consumer Behaviour - Understanding the Communication Process - Communication Mix.

Unit-II: Marketing Communication Mix

Creative Execution in Advertising: Execution on Online and Television - Getting that 'Big Idea' of Creativity - Direct Marketing - Personal Public Relations - Mobile Advertising - Word of Mouth - Village Farmers - Out of Home Media - World Wide Web Communications.

Unit-III: Regulation, Social and Ethical Aspects of Advertising and Promotion

Federal Regulation of Advertising: Regulations of Advertising and Promotion in India - Regulation of other Promotional Areas - Social and Ethical Criticisms of Advertising - Ethical Aspects of Advertising - Truth in Advertising - Advertising to Children - Advertising Controversial Products - Social Aspects of Advertising.

Unit-IV: Sales Planning and Budgeting

Sales Planning Process: Sales Forecasting Methods - Sales Budgeting Process - Methods used for Deciding Sales Budget - Types of Quotas and Quota Setting Procedure - Reasons for Establishing or Revising Sales Territories - Routing and Scheduling Sales Persons - Market Cost Analysis.

Unit-V: Sales Force Management

Recruitment and Selection of the Sales Force - Training the Sales Force - Sales Force Motivation - Sales Force Compensation - Sales Force Control and Evaluation.

REFERENCES:

- George E Belch, Michael A Belch, Keyoor puravi , Advertising and Promotions – An Integrated Marketing Communications perspective , TMH.
- Still, Cundiff, Govoni, Sales Management, Pearson.
- Krutishah, Alan D'Souza, Advertising and Promotions on IMC Perspective, TMH.
- Jaishri Jethwaney, Shruthi Jain, Advertising Management, Oxford.
- K. Sridhara Bhat , Sales and Distribution Management, HPH.
- Richard R Still, Edward W Cundiff, Norman A P Govoni, Sales and Distribution Management, Pearson.

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MBA II YEAR I SEM

R18MBA30 LOGISTICS & SUPPLY CHAIN MANAGEMENT
(Marketing Elective)

Course Aim:

- It provides knowledge, skill, and competence to effectively managed logistics and supply chain management of any small or large organisations.

Learning Outcome:

- The students enable themselves in implementing cost savings, latest techniques, and competitive advantage in the field of logistics and supply chain management.

Unit-I Logistics and Competitive Strategy

Competitive Advantage: Gaining Competitive Advantage through Logistics - Integrated Supply Chains. Competitive Performance: Models in Logistics Management - Logistics to Supply Chain Management - Focus Areas in Supply Chain Management. Customer Service and Retention: Basic Service Capability - Value added Services.

Unit-II: Measuring Logistics Costs and Performance

The Concept of Total Cost Analysis: Principles of Logistics Costing - Logistics and the Bottom -Line. Impact of Logistics on Shareholder Value: Customer Profitability Analysis - Direct Product Profitability - Cost Drivers and Activity-Based Costing.

Unit-III: Logistics and Supply Chain Relationships

Benchmarking the Logistics Process and SCM Operations: Mapping the Supply Chain Processes - Supplier and Distributor Benchmarking - Setting Benchmarking Priorities. Identifying Logistics Performance Indicators: Channel Structure - Economics of Distribution - Channel Relationships - Logistics Service Alliances.

Unit-IV: Sourcing, Transporting and Pricing Products

Sourcing Decisions and Transportation in Supply Chain: Infrastructure Suppliers of Transport Services - Transportation Economics and Pricing - Documentation - Pricing and Revenue Management - Lack of Coordination and Bullwhip Effect - Impact of Lack of Coordination. CRM - Internal Supply Chain Management.

Unit-V: Managing global Logistics and Gobal Supply Chains

Logistics in a Global Economy: Views of Global Logistics - Global Operating Levels - Interlinked Global Economy. The Global Supply Chains: Global Supply Chain Business Processes - Global Strategy - Global Purchasing - Global Logistics - Channels in Global Logistics - Global Alliances -Issues and Challenges in Global Supply Chain Management.

REFERENCES:

- Donald J.Bowersox and David J.Closs: “Logistical Management” The Integrated Supply Chain Process, TMH.
- Edward J Bradi, John J Coyle: “A Logistics Approach to Supply Chain Management, Cengage Learning, New Delhi.
- Sunil Chopra and Peter Meindl: “Supply chain Management: Strategy, Planning and Operation”, Pearson Education, New Delhi.
- Rahul V Altekar: Supply Chain Management, PHI Learning Ltd, New Delhi.
- Deepak P, Miiind M.Oka: “Supply Chain Management” Everest Publishing House, NewDelhi.
- Manish Bansal, Babita Singla: “Retail and Supply Chain Management “, Kalyani Publishers, NewDelhi.

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MBA II YEAR I SEM

R18MBA31 SERVICES MARKETING
(Marketing Elective)

Course Aim:

- The objective of the course is to provide a deeper insight into the Marketing Management of companies offering Services as product.
- The students are able to learn the concepts on customers and standardising, delivering the quality service in the given market, and also facilitates important concepts of service marketing.

Learning Objective:

- The students will be able to understand the characteristics of services, understand consumer behaviour in services, align service design and standards, delivering service, managing services promises.

Unit-I: Foundations of Service Marketing

Role of Services in Modern Economy: Service and Technology - Characteristics of Services Compared to Goods - Services Marketing Mix - Staying Focusing on Customer. Gaps Models of Service Quality - Customer Gap - Provider Gap and Closing Gap.

Unit-II: Focus on the Consumer

Consumer Behaviour in Services: Consumer Expectations in Service - Consumer Perceptions of Service - Understanding Consumer Requirements - Listening to Customers through Research - Building Customer Relationships and Service Recovery.

Unit-III: Aligning Service Design and Standards

Service Innovation and Design Challenges: Types of Service Innovations - Stages in Service Innovation and Development - Service Blueprinting - High Performance Service Innovations - New Service Development Processes. Customer Defined Service Standards: Factors - Types and Development - Physical Evidence and the Services Cape. Customer Service Audit.

Unit-IV: Delivering and Performing Service

Employees Roles in Service Delivery - Customers Roles in Service Delivery - Delivering Service through Intermediaries and Electronic Channels. Managing Demand and Capacity.

Unit-V: Managing Service Promises

Integrated Services Marketing Communications: Need for Coordination - Five Categories of Strategies to Match Service Promises with Delivery. Pricing of Services: Three key ways that Service Prices are different for Customers - Approaches to Pricing Services - Pricing Strategies that link to the four value definitions.

REFERENCES:

- Christoper lovelock,Jochen wirtz, Jayanta Chatterjee, Services Marketing, Pearson.
- Valarie A.Zeithaml & Mary Jo-Bitner: Services Marketing – Integrating customer focus across the firm, TMH.
- John E.G.Bateson, K.Douglas Hoffman: Services Marketing, Cengage Learning.
- Harsh V.Varma: Services Marketing text and cases, Pearson.
- Vinnie Jauhari, Kirti Dutta: Services- Marketing, Operations and Management, Oxford University Press.
- Govind Apte: Services Marketing, Oxford Press.

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MBA II YEAR I SEM

R18MBA32 RETAILING MANAGEMENT
(Marketing Elective)

Course Aim:

- It explains the practices of retailing and also the complex nature and environment in retailing management.

Learning Outcome:

- The students will learn the Modern Retailing Concepts and will able to link it to cases to understand the present Retailing Trends.
- To understand shopping environment, retail formats, functions, retail operation and promotion.

Unit-I: Introduction to Retail Management

Meaning of Retail & Retailing: History - Types - Functions - Utilities - Theories of Retailing - E-Tailing - Structure of Indian Retail Industry - Global Retailing - Service Retailing - FDI Retailing -Rural Marketing.

Unit-II: Retail layouts

Store Layout & Design: Merchandise Display Fixtures - Materials & Finishes - Floors - Interior walls - Ceilings - Lightings - Music - Graphics- Exterior Signage - Interior Signage. Layouts for E-Tailers: Merchandising & Assortment Plans - Merchandise Plan - Merchandise Plan for basic Stocks Retail.

Unit-III: Understanding Shoppers and Shopping:

Shopping Environment: Shopping in a Socio Cultural Context - Shopping Process - Shopping Behaviour - Lifestyle and Demographic Profile of Indian Shoppers - Shopping Patterns in India.

Unit-IV: Pricing & Supply Chain Management

Pricing Objectives & Policies: Interactive Pricing Decisions - Different Pricing Strategies and Price Adjustment Strategies. SCM & Competitive Advantages: Framework of Supply Chain Management - SCM Network Structure - Supply Chain Business Process. Retail Inventory Management: Retail Logistics Management - EDI in SCM.

Unit-V: Delivering Value though Retail Functions

Classification of formats: Ownership based - Store based - Non Store based - Other Retail Formats - Value Based Model of Store Format Choice - Attribute based Model of Store Format Choice. The Competitive Market Place: Non Price Decisions - Types of Competition - Future Changes in Retail Competition.

REFERENCES:

- Piyush Kumar Sinha, Dwarika Prasad Uniyal, Managing Retailing, Oxford.
- Lusch, Dunne, Carver, Introduction to Retailing, Cengage Learning.
- Suja Nair, Retail Management, Himalaya Publication House.
- Aditya Prakash Tripathi, Noopur Agrawal, Fundamentals of Retailing (text and cases), Himalaya Publication House.
- Swapna Pradhan, Retail Management-Text & Cases, TMH.
- Dr. Harjit Singh, Retail Management a global perspective text and cases, S. Chand.

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MBA II YEAR I SEM

R18MBA33 CUSTOMER RELATIONSHIP MANAGEMENT
(Marketing Elective)

Course Aim:

- It provides students, the knowledge of the fundamental aspects of developing and managing CRM, the tools used in retention of customers also adds to effective course frame.

Learning Outcome:

- The student will develop skill set to work on CRM framework, tools and various approaches to retain customers in the market.

Unit-I: Customer Relationship Management

Introduction - Meaning and Definition of CRM - Importance of CRM - Concept and Growth of Relationship Marketing - Scope of Relationship Marketing - Concept of Lifetime Customer and Customer Loyalty - Benefits and Difficulties of CRM.

Unit-II: Building Customer Relationship

Process - Bonding Zero Customer Defections - CRM Framework - Market Share vs. Share of Customers - Life Time Value of Customers.

Unit-III: CRM Process and Implementation

Customer Development Process - Customer Retention - Customer Satisfaction - Importance of Customer Retention - Customer Retention Strategies - Customer Life Time Value - Types of Relationship Management - CRM Process for B2B markets.

Unit-IV: Technological Support in CRM

Technological Applications in CRM: Types of Technological Applications in CRM - Customer Databases and Information Systems. Database Marketing Strategies: CRM Software Solutions for B2C and B2B Markets - Accounting Systems for Customer Acquisition and Retention Costs - Customer Loyalty and Profitability through Technology.

Unit-V: E-CRM - Emerging Trend in CRM

Importance of e-CRM in Service Marketing - Challenges involved in Formulating and Implementing e-CRM Strategies - e-CRM Architecture and its Components - Five engines of e-CRM - Evolution of e-Customer and e-Marketing - e-CRM for Personalized Services.

REFERENCES:

- "Paul Greenberg", CRM at the Speed of Light, TMH.
- "Baran, Galka and Strunk, Principles of CRM, Cengage Learning.
- "Subhasish Das", Customer Relationship Management", Excel Books.
- "Mukesh Chaturvedi and Abhinav Chaturvedi", Customer Relationship Management – An Indian Perspective, Excel Books.
- "Nath", The Nuts & Bolts of CRM, TMH.
- "V.Kumar and Werner.J.Reinartz", Customer Relationship Management, Wiley.

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MBA II YEAR I SEM

R18MBA34 SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
(Finance Elective)

Course Aim:

- To students are able to know the investment alternatives, process and portfolio management

Learning Outcome:

- The objective of this course is to provide the conceptual and Practical understanding of Stock markets Equity & Bond Valuation, Cash market and also Mutual funds.

Unit-I: Investment Environment in India and Equity Valuation

Overview of Indian Financial System - Securities Trading in Stock Markets - Investment Alternatives - The Investment Management Process. Equity Analysis & Valuation: Balance Sheet Analysis - Equity Valuation Models - Intrinsic Value & Market Price - The P/E Ratio & Earnings Multiplier Approach - CAGR - Price to Book value - Price to Sales Ratio - Economic Value Added (EVA) and MVA.

Unit-II: Security Analysis

Fundamental Analysis - Technical Analysis - EMH (Efficient Market Hypothesis). Data Sources and Contemporary Issues: Fundamental Data Sources - Technical Data Sources.

Unit-III: Portfolio Analysis

The Returns and Risks from Investing - Markowitz Portfolio Theory - Mean-Variance Approach - Portfolio Selection - Efficient Portfolios - The Single Index Model - Capital Asset Pricing Model - Arbitrage Pricing Theory.

Unit-IV: Bond Analysis & Valuation & management

Types of Bonds - Interest Rates - Term Structure of Interest Rates - Measuring Bond Yields - Yield to Maturity - Yield to Call - Holding Period Return. Bond Pricing Theorems: Bond Duration - Active and Passive Bond Management Strategies - Bond Immunization - Bond Volatility - Bond Convexity.

Unit-V: Mutual Funds

Types of Mutual Funds Schemes - Structure - NAV (Net Asset Value) - Risk and Return. Performance Evaluation Models: Sharpe Model - Treynor Model - Jensen Model - Fama's Decomposition. Trends in Indian Mutual Funds.

REFERENCES:

- William. F.Sharpe, Gordon J Alexander & J V Bailey: Fundamentals of Investments, PHI.
- Donald E Fischer, Ronald J Jordan: Security Analysis and Portfolio Management, Pearson.
- Prasanna Chandra: Investment analysis and Portfolio Management", TMH.
- Punithavathi Pandian: Security Analysis and Portfolio Management, Vikas.
- M. Ranganatham, R. Madhumathi: Security Analysis and Portfolio Management, Pearson.
- Kevin, SAPM, PHI.

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MBA II YEAR I SEM

R18MBA35 FINANCIAL INSTITUTIONS, MARKETS & SERVICES
(Finance Elective)

Course Aim:

- The objective of the course is to provide to students an understanding of Financial Markets, the major institutions involved and the services offered within this framework.

Learning Outcome:

- The students will get enormous knowledge on Financial Institutions, Securities Markets, and Financial Services.

Unit-I: Introduction

The Structure of Financial System - Equilibrium in Financial Markets - Indicators of Financial Development - Financial System and Economic Development - Financial Sector reforms after 1991. Regulatory and Promotional Institutions: Function and Role of RBI - The Role and Functions of SEBI. Performance of Non-statutory Financial Organization: IFCI - IRBI - NABARD - SIDBI and SFCs.

Unit-II: Banking Institutions

Commercial Banks: Public and Private Sectors - Structure and Comparative Performance - Competition - Interest Rates - Spread and NPAs. Bank Capital Adequacy Norms and Capital Market Support. Banking Innovations: BPLR to Base Rate - Core Banking System - Financial Inclusion - Current Rates: Policy Rates - Reserve Ratios - Lending/ Deposit Rates

Unit-III: Non Banking Financial Institutions

Structure and Functioning of Unit Trust of India and Mutual Funds - Growth of Indian Mutual funds and their Regulation - Role of AMFI. Insurance Companies: Structure and Investment Pattern of LIC - GIC and Other Insurance Companies - Competition - Innovation - Banc assurance - Role of IRDA - Challenges Faced by Insurance Sector.

Unit-IV: Financial and Securities Markets

Structure and Functions of Call Money Market. Government Securities Market: T-bills Market - Commercial Bills Market - Commercial Paper and Certificate of Deposits. Securities Market: Organization and Structure - Listing - Trading and Settlement - SEBI and Regulation of Primary and Secondary Markets.

Unit-V: Asset/Fund Based Financial Services

Lease Finance - Consumer Credit - Hire Purchase Finance. Factoring: Definition - Functions - Advantages - Evaluation - Forfeiting. Bills Discounting - Housing Finance - Venture Capital Financing. Fee-based Advisory Services: Stock Broking - Credit Rating.

REFERENCES:

- L. M. Bhole, Financial Institutions and Markets, TMH.
- M. Y. Khan, Financial Services, TMH.
- Vasant Desai: Financial Markets and Financial Services, Himalaya.
- Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson.
- Gomez, Financial Markets, Institutions and Financial Services, PHI.
- R M Srivatsava: Dynamics of Financial Markets and Institutions in India, Excel.

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MBA II YEAR I SEM

R18MBA36 STRATEGIC INVESTMENT AND FINANCING DECISIONS
(Finance Elective)

Course Aim:

- To explain the role and nature of investment and financial strategies and its Relationship to maximization of wealth/shareholders value.
- To discuss the impact of general and specific inflation on financial and investment strategy decisions.
- To evaluate the motives for financial implications of M&A and lease financing.

Learning Outcome:

- To develop an understanding of the role of financial strategy, in the investing, financing and resource allocation decisions within an organization.
- To develop an understanding of the various strategies those are in use to trade off risk and return

Unit-I: Investment Decisions under conditions of Risk and Uncertainty

Concepts of Risk and Uncertainty: Risk Analysis in Investment Decisions - Risk Adjusted Rate of Return - Certainty Equivalents - Probability Distribution of Cash Flows - Decision Trees - Sensitivity Analysis and Monte Carlo Approach to Simulation. Investment Decisions under Capital Constraints: Capital Rationing vs. Portfolio - Portfolio Risk and Diversified Projects.

Unit-II: Types of Investments and Disinvestments

Project Abandonment Decisions. Evidence of IRR: Multiple IRR - Modified IRR - Pure Simple and Mixed Investments. Lorie Savage Paradox. Adjusted NPV and Impact of Inflation on Capital Budgeting Decisions.

Unit-III: Critical Analysis of Appraisal Techniques

Discounted Pay Back: Post Pay Back - Surplus Life and Surplus Pay Back - Bail-out Pay Back. Return on Investment: Equivalent Annual Cost - Terminal Value - Single Period Constraints - Multi-period Capital Constraint and an Unresolved Problem. NPV Mean Variance Analysis: Hertz Simulation and Hillier Approaches.

Unit-IV: Strategic Analysis of selected Investment Decisions

Lease Financing: Leasing vs. Operating Risk - Borrowing vs. Procuring. Hire purchase and Instalments decisions. Lease Risk Management - Leasing as a Financing Decision.

Unit-V: Financing Decisions

Mergers and Acquisitions: Basic Issues - Strategy - Diversification and Mergers and Acquisitions - Types of Mergers - Cost of Mergers. Government Guidelines for Takeover. Problems on Mergers & Acquisitions. Defensive Strategies for Takeovers and Cases.

REFERENCES:

- Ravi M Kishore “Strategic Financial Management, Taxman.
- Nikiforos T. Laopodis, Understanding Investments-Theories and Strategies, Routledge.
- I. M. Pandey: Financial Management, Vikas.
- Brigham & Ehrhardt: Financial Management, Text and Cases, Cengage.
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MBA II YEAR I SEM

R18MBA37 INTERNATIONAL FINANCIAL MANAGEMENT
(Finance Elective)

Course Aim:

- The objective of the course is to provide students with a broad view of International Monetary Systems and its understanding to enable a global manager to do business in a global setting.

Learning Outcome:

- The students are able to understand about MNC Financial Management.

Unit-I: International Financial Management

An Overview: Importance - Nature and Scope. International Business Methods. Recent Changes and Challenges in IFM

Unit-II: International Flow of Funds

Balance of Payments (BoP): Fundamentals of BoP - Accounting components of BoP - Factors Affecting International Trade flows - Agencies that Facilitate International Flows - Indian BoP Trends. International Monetary System: Evolution - Gold Standard - Bretton Woods's System - the Flexible Exchange Rate Regime - Evaluation of Floating Rates - The Current Exchange Rate Arrangement - The Economic and Monetary Union (EMU).

Unit-III: Foreign Exchange Market

Function And Structure of the Forex Markets: Major Participants - Types of Transactions and Settlements Dates - Foreign Exchange Quotations. Process of Arbitrage: Speculation in the Forward Market - Currency Futures and Options Markets, Overview of the other Markets: Euro Currency Market - Euro Credit Market - Euro Bond Market - International Stock Market.

Unit-IV: Exchange Rates

Measuring Exchange Rate Movements: Factors Influencing Exchange Rates - Government Influence on Exchange Rates - Exchange Rate Systems. Managing Foreign Exchange Risk. International Arbitrage and Interest Rate Parity: Relationship Between Inflation - Interest Rates and Exchange Rates - Purchasing Power Parity - International Fisher Effect - Fisher Effect.

Unit-V: Asset-Liability Management

Foreign Direct Investment: International Capital Budgeting - International Capital Structure and Cost of Capital - International Portfolio Management. International Financing: Equity - Bond Financing - Parallel Loans. Payment Methods of International Trade: Trade Finance Methods - Export–Import Bank of India - Recent Amendments in EXIM Policy - Regulations and Guidelines.

REFERENCES:

- Alan C. Shapiro: Multinational Financial Management, John Wiley.
- Sharan. V: International Financial Management, PHI.
- Madhu Vij: International Financial Management, Excel.
- Ephraim Clark: International Finance, Thomson.
- P. G. Apte: International Financial Management, TMH.
- S. Eun Choel and Risnick Bruce: International Financial Management, TMH.

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MBA II YEAR I SEM

R18MBA38 STRATEGIC MANAGEMENT ACCOUNTING
(FINANCE ELECTIVE)

Course Objective:

- To enable the students to the components of product cost, their calculation methods, and their control.
- To develop the students understanding of management and cost accounting principles and techniques and their application to various decision making situations.

Learning Outcome:

- To distinguish between Management accounting and Cost Accounting. To understand the detailed cost concepts, cost structure and elements of costs of manufacturing and service organizations which have been facing dramatic changes in their business environment.
- To identify and describe the elements involved in decision making, planning and control. To identify and describe the future of Management Accounting System.

Unit-I: Introduction to Management Accounting, Cost Analysis and Control

Management Accounting Vs. Cost Accounting vs. Financial Accounting. Role of Accounting Information in Planning and Control. Cost Concepts and Managerial Use of Classification of Costs: Cost Analysis and Control - Direct and Indirect Expenses - Allocation and Apportionment of Overheads - Calculation of Machine Hour Rate. An Introduction to Activity Based Costing.

Unit-II: Costing for Specific Industries

Costing: Unit Costing - Job Costing - Cost Sheet and Tender and Process Costing and their Variants - Treatment of Normal Losses and Abnormal Losses - Inter-Process Profits - Costing for by-Products and Equivalent Production.

Unit-III: Marginal Costing-I

Introduction: Application of Marginal Costing in Terms of Cost Control - Profit Planning - Closing Down a Plant - Dropping a Product Line - Charging General and Specific Fixed Costs - Fixation of Selling Price - Make or Buy Decisions - Key or Limiting Factor.

Unit-IV: Marginal Costing-II

Selection of Suitable Product Mix: Desired Level of Profits - Diversification of Products - Closing Down or Suspending Activities - Level of Activity Planning. Break-Even Analysis: Application of BEP for Various Business Problems. Inter-Firm Comparison: Need For Inter-Firm Comparison - Types of Comparisons - Advantages.

Unit-V: Budgetary Control

Budget: Budgetary Control - Steps In Budgetary Control - Flexible Budget. Different Types of Budgets: Sales Budget - Cash Budget - Production Budget - Performance Budget - Zero Based Budgeting. An Introduction to Cost Audit and Management Audit. Standard Costing**:** Standard Cost and Standard Costing - Standard Costing Vs Budgetary Control - Standard Costing Vs Estimated Cost - Standard Costing and Marginal Costing - Analysis of Variance - Material Variance - Labour Variance and Sales Variance.

REFERENCES:

- Hansen Mowen, Cost and Management Accounting& Control, Thompson Publications.
- S.P.Jain and K.L.Narang, Cost and Management Accounting, Kalyani Publishers, New Delhi.
- M.Y. Khan, P.K. Jain, Management Accounting: Theory and Problems, TMH, New Delhi.
- James Jiambalvo, Managerial Accounting, John Wiley & Sons, Inc., New Delhi.
- Atkinson, Banker, Kaplan and Young, Management Accounting, PHI.
- Manash Gupta, Cost Accounting Principles and Practice, Pearson Education.

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MBA II YEAR I SEM

R18MBA39 FINANCIAL DERIVATIVES
(Finance Elective)

Course Aim:

- To make students efficient in the area of Derivatives, giving them the knowledge of basics in Derivatives, Future Markets, Option Strategies, etc.

Learning Outcome:

- The students will understand the basic difference between stock market and derivatives market.
- To understand the various types of derivatives and their calculation procedures.

Unit-I: Introduction to Derivatives

Introduction: Development and Growth of Derivative Markets - Types of Derivatives Fundamental Linkages between Spot & Derivative Markets. The Role of Derivatives Market. Uses & Misuses of Derivatives. Commodity Exchanges: MCX - NCDEX - NMCE - Role, Functions & Trading.

Unit-II: Future and Forward Market

Structure of Forward and Future Markets: Mechanics of Future Markets. Hedging Strategies Using Futures. Determination of Forward and Future Prices. Types of Futures: Interest rate Futures - Currency Futures and Forwards.

Unit-III: Options

Distinguish between Options and Futures. Structure of Options Market. Principles of Option Pricing. Option Pricing Models: The Binomial Model - The Black-Scholes Merton Model.

Unit-IV: Option Strategies

Basic Strategies - Advanced Strategies - Trading with Options - Hedging with Options - Currency Options.

Unit-V: Swaps

SWAP: Concept and Nature - Evolution of Swap Market - Features of Swaps. Major Types of Swaps: Interest Rate Swaps - Currency Swaps - Commodity Swaps - Equity Index Swaps - Credit Risk in Swaps - Credit Swaps. Using Swaps to Manage Risk. Pricing and Valuing Swaps.

REFERENCES:

- John C Hull: Options, Futures and other derivatives, Pearson.
- M. Ranganatham & R. Madhumathi : Derivatives and Risk Management, Pearson
- S. L. Gupta: Financial Derivatives, PHI.
- Dubofsky, Miller: Derivatives Valuations and Risk Management, Oxford.
- Don M. Chance, Robert Brooks: Derivatives and Risk Management Basic, Cengage.
- Sundaram Das, Derivatives – Principles and Practice, McGraw Hill.

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MBA II YEAR I SEM

R18MBA40 PERFORMANCE MANAGEMENT
(HR Elective)

Course Aim:

- To give an understanding about performance management and reward system linked with performance.

Learning Outcome:

- The students can understand the importance of performance Management, Performance Appraisals, Reward System, and other performance related concepts.

Unit-I

Performance Management and Reward Systems in Context - Performance Management Process - Performance Management Strategic Planning.

Unit-II

Defining Performance and Choosing a Measurement Approach - Measuring Results and Behaviours. Gathering Performance Information - Implementing a Performance Management System.

Unit-III

Performance Management and Employee Development - Performance Management Skills.

Unit-IV

Reward Systems and Legal Issues - Managing Team Performance.

Unit-V

Bench Marking - Six Sigma - Competency Mapping - Balance Score Card - Pygmalion Effect.

REFERENCES:

- Herman Aguinis, “Performance Management” Pearson.
- Lance A Berger & Dorothy R Berger “The Talent Management Hand Book”, TMH.
- B D Singh, “Performance Management System- a holistic approach” excel Books.
- Prem Chadha “Performance management” Macmillan.
- Srinivas K Kandula “Performance Management” PHI.
- R K Sahu : Performance Management System, Excel.

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MBA II YEAR I SEM

R18MBA41 TRAINING & DEVELOPMENT
(HR Elective)

Course Aim:

- To enable the students to understand the design of training, implementation and evaluation of training programs in the organization.

Learning Outcome:

- The student after completing the course will be familiar with how to do training need analysis, understand various training methods, design training programs, implement training programs and evaluate effectiveness of training programs.

Unit-I: Training in Organizations

Trends in Training - Career Opportunities in Training - Important Concepts and Meanings - Integrating OD - Strategy and Training - Aligning Training Design with Learning Process.

Unit-II: Need Analysis and Training Design

The Training Need Analysis (TNA) Model - TNA and Design - Organizational Constraints - Developing Objectives - Facilitation of Learning and Training Transfers to the Job.

Unit-III: Training Methods

Matching Methods with Outcomes - Lectures and Demonstrations - Games and Simulations - OJT - Computer Based Training (CBT).

Unit-IV: Implementation & Evaluation of Training

Development of Training - Implementation - Transfer of Training - Major Players in Training & Development - Resistance to Training Evaluation - Types of Evaluation.

Unit-V: Areas of Organizational Training

Orientation Training - Diversity Training - Sexual Harassment Training - Team Training - Cross Cultural Training - Training for Talent Management and Competency Mapping.

REFERENCES:

- P.Nick Blanchard, James W. Thacker, A.Anand Ram, " Effective Training", Pearson.
- Raymond A Noe, Amitabh Deo Kodwani, "Employee Training and Development" McGraw Hill.
- Rolf Lynton, Uday Pareek "Training for Development" Sage.
- Jean Barbazette-Training Needs Assessment: Methods, Tools, and Techniques- Wiley.
- Raynold A. Svenson-The Training and Development Strategic Plan Workbook- PHI.
- John Pulparampil- Training for Development-Thompson publications.

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MBA II YEAR I SEM

R18MBA42 MANAGEMENT OF INDUSTRIAL RELATIONS
(HR Elective)

Course Aim:

- The aim of the course is to enable HR elective students develop awareness towards labour laws. The students will understand how to deal with legal problems emanating from employer and employee relations in organizations.

Learning Outcome:

- The student understands the industrial relations, its importance in HR and various Labour Laws like Factories Act, Wage and Bonus Act and Dispute Preventive and Corrective Mechanisms. They will also understand the role of Trade Unions, Settlement of disputes, Collective Bargaining, Wage Policy.

Unit-I: Industrial Relations

Introduction - Dunlop's Industrial Relations Systems - Characteristics of Indian IR System. Trade Unions: Union Purpose - Trade Union - Functions - Methods - Politics - Types of Unions. Trade Unions in India: Union Structure and Characteristics. Recognition of Unions: States Provisions for Recognition. Rights of Recognized Unions - Unfair Labour Practices.

Unit-II: Settlement of Disputes

Role of State Dispute Settlement Machinery and its Instruments. Legislation: Causes of Disputes - Right to Strike - Major Strikers - Tripartite and Bipartite Bodies - Standing Orders and Grievance Procedure.

Unit-III

Collective Bargaining - Conciliation - Arbitration - Adjudication - The Industrial Dispute Act 1947 - Labour Welfare Work - Labour Welfare Officer - Worker's Participation.

Unit-IV

Wage Policy and Wage Regulation Machinery - Wage Legislation - Payment of Wages Act 1936 - The Payment of Bonus Act, 1965

Unit-V

The Factories Act 1948 - Mines Act 1952 - Industrial Relations and Technological Change.

REFERENCES:

- Mamoria, Mamoria, Gankar "Dynamics of Industrial Relations" Himalaya Publishing House.
- C.B.Mamoria, VSP Rao "personnel management- text & cases", Himalaya.
- J.A.Kulkarni, Asha Pachpande, Sandeep Pachpande, "Case Studies in Management", pearson.
- Padhi "Labour and Industrial Relations" PHI.
- Arun Monappa,Ranjeet Nambudiri,Selvaraj " Industrial Relations and Labour Laws", TMH.
- Ratna Sen "Industrial Relations-Text and cases "Macmillan Publishers.

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MBA II YEAR I SEM

R18MBA43 INTERNATIONAL HUMAN RESOURCE MANAGEMENT
(HR Elective)

Unit-I: Introduction to IHRM

Basics of IHRM Importance: Definition - Nature - Scope and Components of IHRM Strategy - Functions - Difference between Domestic HRM and IRHM. Overview of International HR Activities: HR Planning - Recruitment - Selection - Training and Development - Performance Management - Remuneration - Repatriation - Employee Relations - Approaches to the Study of Employment Policy across Countries.

Unit-II: International Recruitment and Selection

Approaches to International Recruitment: Ethnocentric - Polycentric - Geocentric – Region centric. Selection Process: Factors Effecting in Expatriate Selection Process - Technical Ability - Cross-cultural Suitability - Individual Adjustments - Family Adjustments. IHRM Practices: USA - UK - Japan and India, A comparative study.

Unit-III: Managing HRM in Virtual Organization, Globalization & HRM

Meaning - Features and Types of Virtual Organizations - Advantages and Disadvantages - Managing HR in Virtual Organizations - Impact of Globalization on Employment - HRD - Wage & Benefits - Collective Bargaining - Participative Management - Ethical Issues in HR.

Unit-IV: IHRM Model of India

Culture and Indian Managers - Indian Managers - Responses to HR Practices across the World - Implication for Multinationals - MNCs Skill based approach and Staff Training and Development Priority - The Global Managers and Future Organizations - India's Response to Universalization of HR Principles - Policies and Practices - Cross-Convergence.

Unit-V: Special Issues in IHRM

Challenges of Globalization and Implications of Managing People and Leveraging Human Resources for competitive advantage - Impact of IT on Human Resource Management - IT and HR - Out Sourcing HR - Globalization - Quality of Work Life and Productivity - Reorienting Work Force through HR Interventions - Women Expatriates and their Problems - Exit Policy and Practices - Impact on Participative Management and Quality Circles.

REFERENCES:

- N. Sengupta & Mousumi, S. Bhattacharya, International HRM, Excel Books.
- P.L. Rao, International Human Resource Management – Text and Cases, Revised Edition, Excel Books- New Delhi.
- Edwards - International HRM, Pearson Education.
- K. Aswathappa - International Human Resource Management Sadhna Dash Text and Cases, Tata McGraw Hill Publishing Company Ltd.
- P. Subba Rao, International Human Resource Management Himalaya Publishing House Dr. Nilanjam Sengupta- International Human Resource Management Excel Books, New Delhi.

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MBA II YEAR I SEM

R18MBA44 COMPENSATION & REWARD MANAGEMENT
(HR Elective)

Course Aim:

- It enables the student understand the concepts issues and challenges of compensation and reward management.

Learning Outcome:

- The student understands how to design the compensation for various levels of jobs in the organization, designing the compensation for special groups. Government and legal issues in compensation design.

Unit-I

The Pay Model Strategy: The Totality of Decisions - Defining Internal Alignment - Job Analysis - Evaluating Work - Job Evaluation - Person-based Structures.

Unit-II

Defining Competitiveness - Designing Pay Levels - Mix and Pay Structures - Pay for Performance. The Evidence Pay for Performance Plans.

Unit-III

Performance Appraisals - Benefits Determination Process - Statutory Benefits including Health Care - Employee Welfare and Retirement Benefits.

Unit-IV

Compensation of Special Groups - Union Role in Wage and Salary Administration. International Pay Systems.

Unit-V

Government and Legal Issues in Compensation. Public Sectors Pay Management: Making it work.

REFERENCES:

- George T Milkovich, Jerry M Newman, C S Venkata Ratnam" TMH.
- B D Singh "Compensation and Reward Management" Excel Books.
- Joseph J.Martocchio "Strategic Compensation" Pearson.
- Kanchan Bhatia "Compensation Management" Himalaya.
- Henderson "Compensation Management in a Knowledge Based World", Pearson.
- Michale Armstrong" Employee Reward" University Press.

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MBA II YEAR I SEM

R18MBA45 LEADERSHIP & CHANGE MANAGEMENT
(HR Elective)

Course Aim:

- To empower the students with the concepts, theories and approaches to lead organizations. The knowledge gained will help the students to feel confident to add value to the organizations.
- The course enables the student to understand the concept change management. This will help them to emerge as leaders in the organizations.

Learning Outcome:

- The students will be able to understand in definitions, concepts and process of leadership.
- The will also understand the approaches and theories of leadership, leadership styles, leadership types like transactional leadership, transformational leadership, team leadership.
- The student understands the need to bring change, how to design change in the organizations, role of leadership in change management, change communication and resistance to change and the role of HR in change management.

Unit-I: Introduction and Skills Approach to Leadership

Definition - Components of Leadership - Trait Approach to Leadership: Strengths - Criticisms - Applications - Skills Approach to Leadership - Ohio State Studies - Michigan Studies - Blake and Mouton's Leadership Gird: Strengths - Criticisms - Applications.

Unit-II: Contingency Leadership

Contingency Theory Description - Leadership Styles - Situational Variables - Strengths and Criticisms - Applications of Contingency Approach - Path-Goal Theory: Strengths - Criticisms - Applications. Transformational Leadership: Strengths - Criticisms – Applications. Servant Leadership: Definition - Ten Characteristics of Servant Leader - Strengths - Criticisms - applications.

Unit-III: Organizational Design and Change

Strategic Level Change - Group and Team Level Change - Individual Level Change.
Organizational Structure - Organizational Culture and Management of Change - Resistance to Change - Organizational Learning - Power - Politics and Organizational Change- Ethics and Managing Change.

Unit-IV: Employee Relations and Managing Change

The Management of Change - Technological Change. Management of Change - Evaluating and Promoting Change.

Unit-V: Communicating the Change

Importance of Communication in Change Management. Communicating during the Change Period and Process - Developing Feedback Mechanism and Skills. Organisational Change Behaviour: Aspects of Leader - Rejoice the Abilities of Followers. Gap and Mapping the Change.

REFERENCES:

- Peter G. Northouse “Leadership: Theory & Practices” Sage Publications.
- Mark Hughes, “Managing Change – a critical perspective”, Universities Press.
- Adrian Thornhill, Phil Lewis,Mike Millmore. Mark N K Saunders “Managing change”, Pearson.
- Richerd L. Hughes, Leadership, Mc. Graw Hill, New Delhi
- Uday kumar Haldar, “leadership & team building”, Oxford
- Gary Yukl, “Leadership in Organizations” Pearson.

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MBA II YEAR I SEM

R18MBA46 BUSINESS INTELLIGENCE
(Systems Elective)

Course Aim:

- It enables the student understand the concepts of Business Intelligence.

Learning Outcome:

- The student understands Data Ware Housing, Data Mining for Business Intelligence, Business Rules and Business Intelligence Implementation.

Unit-I: Introduction to Business Intelligence

The Business pressure-Responses and support model-Definition of BI- Architecture of BI-Styles of BI-vent-Driven alerts-A cyclic process of Intelligence Creation. The value of Business intelligence-Value driven and Information use-Performance metrics and key performance indicators-horizontal use cases for BI.

Unit-II: Data Ware Housing-Definitions and concepts

DW process an Innovation-Data Warehousing Implementation-Data warehousing Administration-Security Issues and future trends. Business Performance Management-Overview Strategic plan, monitor, performance measurement, BPM methodologies-BPM Techniques-Performance dashboard and scorecards.

Unit-III: Data mining for Business Intelligence

Data mining concepts and definitions-Data mining applications- Artificial neural Networks for data mining. Text and web mining-Natural language processing-Text mining applications-Text mining process-tools-Web mining overview-Web content overview-Web structure mining-Web usage mining.

Unit-IV

Business Rules-the value preposition of business rules-Business rules approach-Business rule system sources of business rules and management approach.

Unit-V

Business intelligence implementation-Business Intelligence and integration implementation-connecting in BI systems- Issues of legality- Privacy and ethics- Social networking and BI.

REFERENCES:

- Efraim Turban et al. “Business Intelligence”, Pearson Education.
- David Loshin “Business Intelligence”, Elsevier.
- Rajiv Sabherwal “Business Intelligence” Wiley Publications.
- Philo Janus, Stacia Misner, Building Integrated Business Intelligence Solutions with SQL Server, 2008 R2 & Office 2010, TMH.
- Nina Godbole & Sunit Belapure “Cyber Security” Wiley India.
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MBA II YEAR I SEM

R18MBA47 DATABASE MANAGEMENT SYSTEMS
(Systems Elective)

Course Aim: To give an understanding Data Warehousing and Data Management concept.

Unit-I: Managing Data

Individual Data Management, Organizational Data Management, Components of Organizational Memory, Evaluation of Database Technology File-Oriented Systems: Meeting the Need for Random Access Processing Information as Resource, Other Limitations of Traditional File Systems, Data Base Systems, Hierarchical Network Model Systems, Relational Database Systems - Database Systems: Hardware, Software, Data, People and Relationship of the four System Components.

Unit-II: Database Systems in the Organizations

Data Sharing and Data Bases – Sharing Data Between Functional Units, Sharing Data Between Different Levels of Users, Sharing Data Between Different Locations, The Role of the Data Base, Strategic Data Base Planning – The Need for Data Base Planning, The Data Base Project, The Data Base Development Life Cycle (DDLC).

Unit-III: Risks and Costs of Database

Organizational Conflicts – Development Project Failures – System Failure – Overhead costs – Need for Sophisticated Personnel – Separating Physical and Logical Data Representation – Client / Server Data Base Architecture, Three-Level Data Base Architecture.

Unit-IV: Data warehousing Introduction

What is a Data warehouse, who uses Data warehouse, Need for Data warehouse, Applications of Data Warehouse concepts. The Data warehouse Data Base: Context of Data warehouse Data Base, Data Base Structures – Organizing Relational Data warehouse – Multi-Dimensional Data Structures – Choosing a Structure, Getting Data into the Data warehouse – Extraction, Transformation, Cleaning, Loading and Summarization, Meta Data – Human Meta Data, Computer Based Meta Data for people to use, Computer-based Meta Data for the computer to use.

Unit-V Analyzing the Contexts of the Data warehouse

Active Analysis, User Queries – OLAP, OLAP Software Architecture – Web Based OLAP, General OLAP Product Characteristics, Automated Analysis – Data Mining, Creating a Decision Tree, Correlation and Other Statistical Analysis, Neural Networks, Nearest Neighbour Approaches, Putting the Results to Use. Constructing A Data warehouse System: Stages of the Project - The Planning Stage – Justifying the Data warehouse – Obtaining User Buy-in – Overcoming Resistance to the Data warehouse – Developing a Project Plan, Data warehousing Design Approaches – The Architecture Stage – The Data warehouse Data Base – The Analysis Architecture – Data warehouse Hard Ware.

REFERENCES:

- Richard T Watson: Data Management Data Bases and Organisations, 5/E , Wiley – India
- Berson Smith, Data Warehousing, Data Mining 7 OLAP, TMH.
- Marakas : Modern Data Warehousing, Mining, and Visualization Core Concepts, Pearson
- Sivanandam, Data Mining Techniques and Tasks, Thomson
- Gary W Hansen, James V Hansen: Data Base Management and Design, PHI.
- Michael J.A. Berry, Gordon S. Linoff, Data Mining Techniques, Wiley -India.

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MBA II YEAR I SEM

R18MBA48 DECISION SUPPORT SYSTEMS
(Systems Elective)

Course Aim:

- It enables the student understand how to build and implement Decision Support system.

Learning Outcome:

- The student understands Decision Support System benefits, types, building and implementation, DSS Software tools, Group Decision Supportive System, and Data Warehousing.

Unit-I: Introduction to Decision Support System (DSS)

How DSS evolved- DSS Benefits-Systems, Information Quality and Models-Dataflow diagram Information quality- Types of DSS- DSS hierarchy- Generalizing DSS categories.

Unit-II: Building and implementing DSS

DSS on the centre corporate systems- Internet and client/ Server computing in DSS- DSS on standalone system-Choosing a DSS Hardware environment.

Unit-III: DSS software tools

Standard Package-specialized tools and Generators-Programming language for DSS- Building DSS- DSS development process-Project development participants-Overcoming Resistance of Change- Models in DSS.

Unit-IV: Group Decision Support System

Why group DSS? –Group Vs Individual activities-Media richness and Task Types-Types of Group DSS-Group DSS in use today-Group ware products.

Unit-V: Data Warehousing

DW-DW concepts- The DW database-Database structure-Getting the data into the data warehouse- Metadata.

REFERENCES:

- Efrem G.Mallach" Decision Support and Data Warehouse Systems" TMH.
- Efraim Turban "Decision Support and Busines Intelligence Systms" Pearson.
- Dhiraj Sharma: Foundations of I T, Excel.
- Nina Godbole & Sunit Belapure, "Cyber Security" Wiley India.
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- Dr Milind M Oka "Cases in Management Information system 'Everest.

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MBA II YEAR I SEM

R18MBA49 E-BUSINESS
(Systems Elective)

Course Aim:

- It enables the student understand the concepts of Electronic Business.

Learning Outcome:

- The student understands E-Business, its Models, E-Business plans, E-Business Application and Securing E- Business.

Unit-I

Electronic Business- Understanding new Internet Economy and Business-E-business an e-commerce-Features of E-Business- Advantages of E-Business- Business Environment-Establishing E-Business.

Unit-II

E-Business Models- E-Business Structure- E-Business models- E-Business model Design-IT infrastructure requirement of E-business models.

Unit-III

Creating E-Business plans- software programs to create a business- Phases /Aspects of E-Business- e-Marketing and sales Strategies-website and portal management.

Unit-IV

E-Business Applications- Characteristics o E-Business applications-Project palming approach for E-Business applications- Application Integration- application in various domains.

Unit-V

Securing your e-business- risk Management- business continuity planning-Network and web site security website Defacement-Security audit and Penetration Testing.

REFERENCES:

- Kulkarni et al. “E-Business” Oxford.
- Dave chaffey, e-business & e- commerce management- strategy, implementation and practice, 5th edition, Pearson.
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MBA II YEAR I SEM

R18MBA50 CYBER SECURITY
(Systems Elective)

Course Aim:

- It enables the student to understand Cyber crime, Tools and methods used in cyber crime and Cyber Security.

Learning Outcome:

- The student understands the cyber crimes. Computer forensic system and Cyber Security.

Unit-I: Cyber Crime

Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations-Organizational measurement for Handling mobile-Security policies and measures in mobile computing era.

Unit-II

Tools and methods used in cyber crime-Proxy servers and Anonymizers- Phishing- Password cracking-Key loggers and Spy wares-Virus and worms-Trojan Horse and Backdoors Steganography-SQL Injection-Buffer overflow-Attacks on wireless network.

Unit-III

Understanding computer forensic-Historical background of cyber forensic-Forensic analysis of e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory-Relevance of the OSI 7 Layer model to computer Forensic-Computer forensic from compliance perspectives.

Unit-IV

Forensic of Hand –Held Devices-Understanding cell phone working characteristics-Hand-Held devices and digital forensic- Toolkits for Hand-Held device-Forensic of i-pod and digital music devices-Techno legal Challenges with evidence from hand-held Devices.

Unit-V

Cyber Security –Organizational implications-cost of cybercrimes and IPR issues-Web threats for organizations: the evils and Perils-Social media marketing-Security and privacy Implications-Protecting people privacy in the organizations-Forensic best practices for organizations.

REFERENCES:

- Nina Godbole & Sunit Belapure “Cyber Security”, Wiley India.
- Harish Chander, “cyber laws & IT protection”, PHI learning pvt.ltd.
- Dhiren R Patel, “Information security theory & practice”, PHI learning pvt ltd.
- Ms. M. K. Geetha & Ms. Swapne Raman “Cyber Crimes and Fraud Management” Macmillan.
- Pankaj Agarwal : Information Security & Cyber Laws (Acme Learning), Excel.
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MBA II YEAR I SEM

R18MBA51 INFORMATION SYSTEM CONTROL AND AUDIT
(Systems Elective)

Course Aim:

- It enables the student understand the concepts of Information System and Control.

Learning Outcome:

- The student understands the audit standards, Audit Process, Computer assistance Audit tools, Managing Audit tools and Strategy and Standards for Auditing.

Unit-I

Audit and review the role of Information Technology-Audit standards-Importance of audit standard independence- AICPA preannouncement- The need for IT audit function- role of the IT auditor-Legal implications.

Unit-II

Audit process in an information Technology Environment-Risk Assessment-Audit budget-Objectives and context-preliminary review-Field-work and implementing audit Methodology-Documenting results.

Unit-III

Computer Assistance Audit tools- Auditor productivity tools-Flowcharting Techniques-Flowcharting an Analytical tool- Defining critical data-Flowcharting technique-Generalizing audit software-Computer forensic.

Unit-IV

Managing IT audits- Establish a career development and planning-Evaluating IT audit quality-criteria for IT audit quality-IT auditing in new millennium-code of ethics and professional standards-Private industry-Management consultancy.

Unit-V

Strategy and standards for auditing- Strategic planning- communication- demand management-Architecture and standards- Business architecture- application and information architecture-Architecture functions.

REFERENCES:

- Sandra Senft & Fredrick “Information Technology Control and Audit “CRC Press.
- D P Dube, V P Gulati, Information System Audit and Assurance – Includes case studies and chelists from the banking industry, TMH.
- Nina Godbole & Sunit Belapure “Cyber Security”, Wiley India.
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- Dr. Milind M Oka “Cases in Management Information Systems, Everest.
- Subash Chandra Das-Management Control Systems : Principles and Practices-PHI

MASTER OF TECHNOLOGY
In
VLSI & EMBEDDED SYSTEMS

ACADEMIC REGULATIONS, COURSE COVERAGE SUMMARY

Department of Electronics and Communication Engineering



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTUH, Hyderabad, Approved by AICTE - Accredited by NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally, Kompally, Secunderabad – 500100, Telangana State, India.

Contact Number: 7207034237, 9133555162, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

PRELIMINARY DEFINITIONS AND NOMENCLATURES

*"Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

*"Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

*"Commission" means University Grants Commission.

*"AICTE" means All India Council for Technical Education.

*"University" the Jawaharlal Nehru Technological University, Hyderabad.

*"College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

*"Program" means:

Master of Technology (M.Tech) degree program

PG Degree Program: M.Tech

*"Branch" means specialization in a program like M.Tech degree program in Electronics and Communication Engineering, M.Tech degree program in Computer Science and Engineering etc.

*"Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

*T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

“A thought beyond the horizons of success committed for educational excellence”

PRINCIPAL

MASTER OF TECHNOLOGY
POSTGRADUATE PROGRAM
ACADEMIC REGULATIONS (Batch admitted from the Academic Year 2018-2019)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally, Kompally, Secunderabad – 500100, Telangana State, India.
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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

ACADEMIC REGULATIONS R-18 FOR M. TECH. (REGULAR) DEGREE COURSE

Academic Regulations of R-18 are applicable for the students of M. Tech. (Regular) Course from the Academic Year 2018-19 and onwards. The M.Tech Degree of Malla Reddy College of Engineering & Technology (MRCET), Secunderabad shall be conferred on candidates who are admitted to the program and who fulfill all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS

Admission to the above program shall be made subject to eligibility, qualification and specialization as prescribed by the University from time to time.

Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University (or) State Government (or) on the basis of any other order of merit as approved by the University, subject to norms as laid down by the State Govt. from time to time.

2.0 AWARD OF M. TECH. DEGREE

2.1. A student shall be declared eligible for the award of the M. Tech. Degree, if he pursues a course of study in not less than two and not more than four academic years.

2.2. A student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the year of his admission, shall forfeit his seat in M. Tech. course.

2.3. The student shall register for all 72 credits and secure all the 72 credits.

2.4. The minimum instruction days in each semester are 90.

3.0 A. COURSE OF STUDY

The following specializations are offered at present for the M. Tech. course of study.

1. Aerospace Engineering
2. Computer Science and Engineering
3. Machine Design
4. VLSI and Embedded Systems
5. Thermal Engineering

and any other course as approved by the MRCET from time to time.

3.0 B. Departments offering M. Tech. Programmes with specializations are noted below:

Aeronautical Engineering	Aerospace Engineering
Computer Science Engineering	Computer Science Engineering
Electronics & Communication Engineering	VLSI and Embedded Systems
Mechanical Engineering	Machine Design
Mechanical Engineering	Thermal Engineering

4.0 ATTENDANCE

The programs are offered on a unit basis with each subject being considered a unit.

4.1 A student shall be eligible to write University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

4.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester shall be granted by the College Academic Committee.

4.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

4.4 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration shall stand cancelled.

4.5 A prescribed fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

4.6 A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

4.7 In order to qualify for the award of the M. Tech. Degree, the candidate shall complete all the academic requirements of the subjects, as per the course structure.

4.8 A student shall not be promoted to the next semester unless he satisfies the minimum academic requirements of the previous semester.

5.0 EVALUATION

The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks for theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

For the theory subjects 70 marks shall be awarded based on the performance in the End Semester Examination and 30 marks shall be awarded based on the Internal Examination Evaluation. The internal evaluation consists of two mid-term examinations each covering descriptive paper 24 marks which consists of six questions and answers any four questions, each carrying 6 marks a total duration of 2 hours. Average of the two mid-term examinations shall be taken as the final marks secured by each candidate. Six (6) marks are allocated for Assignments (as specified by the subject teacher concerned). The total marks secured by the student in mid-term examination and assignment are evaluated for 30 marks.

However, any student scoring internal marks less than 40% will be given a chance to write the internal exam once again after he/she re-registering for the concerned subject and paying stipulated fees as per the norms.

5.1 The end semesters examination will be conducted for 70 marks with 5 questions consisting of two questions each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carries 14 marks.

5.2 For practical subjects, 70 marks shall be awarded based on the performance in the End Semester Examinations and 30 marks shall be awarded based on the day-to-day performance as Internal Marks.

5.3 There shall be two seminar presentations during II year I semester and II semester respectively. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Departmental Academic Committee consisting of Head of the Department, Supervisor and two other senior faculty members of the department. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.

5.4 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End semester Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Examination taken together.

5.5 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.4) he has to reappear for the End semester Examination in that subject.

5.6 A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and so has failed in the end examination. In such a case, the candidate must re-register for the subject(s) and secure the required minimum attendance. The candidate's attendance in the re-registered subject(s) shall be calculated separately to decide upon his eligibility for writing the end examination in those subject(s). In the event of the student taking another chance, his internal marks and end examination marks obtained in the previous attempt stand cancelled.

5.7 In case the candidate secures less than the required attendance in any subject, he shall not be permitted to write the End Examination in that subject. He shall re- register the subject when next offered.

5.8 Laboratory examination for M. Tech. courses must be conducted with two Examiners, one of them being the Laboratory Class Teacher and the second examiner shall be another Laboratory Teacher.

5.9 For Mini Project in II year I Semester, 100 marks are allocated and will be evaluated by the Department Academic Committee consisting of head of the Department, Supervisor and two other senior faculty members. A candidate has to secure a minimum of 50% of marks to be declared successful.

6.0 EVALUATION OF PROJECT/DISSERTATION WORK

Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

6.1 A Project Review Committee (PRC) shall be constituted with Principal as Chairperson, Heads of all the Departments offering the M. Tech. programs and two other senior faculty members.

6.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.

6.3 After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the Departmental Academic Committee for approval. Only after obtaining the approval of the Departmental Academic Committee can the student initiate the Project work.

6.4 If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the Departmental Academic Committee. However, the Departmental Academic Committee shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

6.5 A candidate shall submit his status report in a bound-form in two stages at least with a gap of 3 months.

6.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of theory and practical course with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Principal through Head of the Department and make an oral presentation before the PRC.

6.7 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/Institute.

6.8 The thesis shall be adjudicated by one examiner selected by the University. For this, the Principal of the College shall submit a panel of 5 examiners, eminent in that field, with the help of the guide concerned and head of the department.

6.9 If the report of the examiner is not favorable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected.

6.10 If the report of the examiner is favorable, Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the Thesis. The Board shall jointly report the candidate's work as one of the following:

A. Excellent
B. Good
C. Satisfactory
D. Unsatisfactory

The Head of the Department shall coordinate and make arrangements for the conduct of Viva- Voce examination.

If the report of the Viva-Voce is unsatisfactory, the candidate shall retake the Viva- Voce examination only after three months. If he fails to get a satisfactory report at the second Viva- Voce examination, he will not be eligible for the award of the degree.

7.0 AWARD OF DEGREE AND CLASS

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the Credit Based Semester System (CBCS).

7.1 Letter Grades and Grade Points:

The UGC recommends a 10-point grading system with the following letter grades as given below:

Letter Grade	Points	% of Marks secured in a subject or course (Class Intervals)
O (Outstanding)	10	Greater than or equal to 85
A+(Excellent)	9	75 and less than 85
A(Very Good)	8	65 and less than 75
B+(Good)	7	60 and less than 65
B(Average)	6	55 and less than 60
C (Pass)	5	50 and less than 55
F(Fail)	0	Below 50
Ab (Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

Students with final CGPA (at the end of the programme) ≥ 7.50, and shall be placed in **'first class with distinction'**.

Students with final CGPA (at the end of the programme) ≥ 6.50 but < 7.50, shall be placed in **'first class'**.

Students with final CGPA (at the end of the programme) ≥ 5.50 but < 6.50, shall be placed in **'Second class'.**

All other students who qualify for the award of the degree, with final CGPA (at the end of the programme) ≥ 5.00 but < 5.50, shall be placed in **'pass class'.**

% of Marks = (final CGPA) x 10

7.2 Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

Credit points (CP) = grade point (GP) x credits …. For a course

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$SGPA\ (Si) = \Sigma(Ci \times Gi) / \Sigma Ci$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

CGPA = Σ(Ci x Si) / Σ Ci

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

7.3 A student obtaining 'F' grade in any subject shall be deemed to have 'failed' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

7.4 A student who has not appeared for examination in any subject '**Ab'** grade will be allocated in that subject, and student shall be considered **'failed'**. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

7.5 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

7.6 A student earns grade point (GP) in each subject/ course, on the basis of the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (CP) = grade point (GP) x credits …. For a course

7.7 The student passes the subject/ course only when **GP $\geq$ 5 ('C' grade or above)**

Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24

I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
	Total Credits = 42			Total Credits Points = 327

CGPA = 327/42 = 7.79

7.8 For merit ranking or comparison purposes or any other listing, **only** the **'rounded off'** values of the CGPAs will be used.

7.9 For calculations listed in regulations 7.2 to 7.7, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

8.0 Passing standards

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the **Choice Based Credit System (CBCS).**

8.1 student shall be declared successful or 'passed' in a semester, if student secures a GP $\geq$ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA $\geq$ 5.00 at the end of that particular semester); and a student shall be

declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the degree as required.

8.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 88 credits (with CGPA ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have 'qualified' for the award of the M.Tech. degree in the chosen branch of Engineering as selected at the time of admission.

A student who qualifies for the award of the degree as listed above shall be placed in the following classes.

Students with final CGPA (at the end of the post graduate programme) ≥ 7.50, shall be placed in 'first class with distinction'.

Students with final CGPA (at the end of the post graduate programme) ≥ 6.50 but < 7.50, shall beplacedin'firstclass'.

Students with final CGPA (at the end of the post graduate programme) ≥ 5.50 but < 6.50, shall beplaced in 'Second class'.

All other students who qualify for the award of the degree (listed above), with final CGPA (at the end of the post graduate programme) ≥ 5.00 but < 5.50, shall be placed in 'pass class'.

A student with final CGPA (at the end of the post graduate programme) < 5.00 will not be eligible for the award of the degree.

Students fulfilling the conditions listed above alone will be eligible for award of 'university rank' and 'gold medal'.

9.0 Declaration of results

9.1 Computation of SGPA and CGPA are done using the procedure listed in 7.2 to 7.7.

9.2 For final percentage of formula marks equivalent to the computed final CGPA, the following formula maybe used.

% of Marks = (final CGPA – 0.5) x 10

10.0 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the Institute or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

11.0 TRANSITORY REGULATIONS

11.1 Discontinued, detained, or failed candidates are eligible for admission to two earlier or equivalent subjects at a time as and when offered.

12. GENERAL

12.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

12.2 The academic regulation should be read as a whole for the purpose of any interpretation.

12.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council of the College is final.

12.4 The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Academic Council of the College/Affiliating University.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The

		performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Using objectionable, abusive or offensive	Cancellation of the performance

	language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic

		regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the

		subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)

i. A show cause notice shall be issued to the college.
ii. Impose a suitable fine on the college.
iii. Shifting the examination centre from the college to another college for a specific period of not less than one year.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

M.TECH – VLSI & EMBEDDED SYSTEMS

COURSE STRUCTURE

I Year I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/ P/ D	C	MAX MARKS	
						INT	EXT
1	R18D6801	VLSI Technology & Design	3	-	3	30	70
2	R18D6802	CPLD & FPGA Architectures& Applications	3	-	3	30	70
3	R18D6803	Embedded System design	3	-	3	30	70
4	R18D6807 R18D6808 R18D6809	ELECTIVE-I 1.VLSI Signal Processing 2.CMOS Analog Integrated Circuit Design 3.Programming Languages for Embedded Software	3	-	3	30	70
5	R18D6810 R18D6811 R18D6812	ELECTIVE-II 1.CMOS Digital Integrated Circuit design 2.CAD of Digital System 3.System Design with Embedded Linux	3	-	3	30	70
6	OE I	OPEN ELECTIVE –I	3	-	3	30	70
7	R18D6881	VLSI Lab	-	3	2	30	70
8	R18DHS54	Audit Course I - Value Education	2	-	-	50	-
Total			20	3	20	260	490

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE I	
Subject Code	**Subject Name**
R18DME51	Non-Conventional Energy Sources
R18DME52	Industrial Safety
R18DME53	Operations Research
R18DHS51	Business Analytics
R18DCS51	Scripting Languages
R18DAE51	Mathematical Modeling Techniques
R18DEC51	Embedded Systems Programming

I Year II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D6804	Embedded Real Time Operating Systems	3	-	3	30	70
2	R18D6805	CMOS Mixed Signal Circuit Design	3	-	3	30	70
3	R18D6806	Low Power VLSI Design	3	-	3	30	70
4	R18D6813 R18D6814 R18D6815	ELECTIVE – III 1.Adhoc –Wireless Networks 2.SOC Design 3.Memory Technologies	3	-	3	30	70
5	R18D6816 R18D6817 R18D6818	ELECTIVE- IV 1.Physical Design Automation 2.Communication Buses and Interfaces 3.Multimedia Signal Coding	3	-	3	30	70
6	OE II	OPEN ELECTIVE- II	3	-	3	30	70

7	R18D6882	Embedded Systems Lab	-	3	2	30	70
8	R18DHS55	Audit Course II - English for Research Paper Writing	2	-	-	50	
Total			20	3	20	260	490

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II	
Subject Code	Subject Name
R18DME54	Composite Materials
R18DME55	Waste to Energy
R18DME56	Industrial Management
R18DHS52	Cost Management of Engineering Projects
R18DCS52	Information Security
R18DAE52	Unmanned Aerial Vehicles
R18DEC52	Research Methodology

II Year I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D6883	Seminar-I	-	-	2	50	-
2	R18D6891	Mini Project	-	-	4	100	-
3	R18D6892	Project Review-I	-	-	8	100	-
Total			-	-	14	250	-

II Year II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D6884	Seminar-II	-	-	2	50	-
2	R18D6893	Project Review-II	-	-	8	100	-
3	R18D6894	Project Viva-voce	-	-	8	-	100
Total			-	-	18	150	100

SEMESTER-I

(R18D6801) VLSI TECHNOLOGY AND DESIGN

UNIT –I:

Review of Microelectronics and Introduction to MOS Technologies:

MOS, CMOS, BiCMOS Technology, Basic Electrical Properties of MOS, CMOS &BiCMOS Circuits: I_{ds} –V_{ds} relationships, ThresholdVoltage V T , g_m , g_{ds} and ω_o , Pass Transistor, MOS, CMOS & Bi CMOS Inverters, Z_{pu} /Z_{pd} , MOS Transistor circuit model, Latch-up in CMOS circuits.

UNIT –II:

Layout Design and Tools:

Transistor structures, Wires and Vias, Scalable Design rules, Layout Design tools.

Logic Gates & Layouts:

Static Complementary Gates, Switch Logic, Alternative Gate circuits, Low power gates, Resistive and Inductive interconnect delays.

UNIT –III:

Combinational Logic Networks:

Layouts, Simulation, Network delay, Interconnect design, Power optimization, Switch logic networks, Gate and Network testing.

UNIT –IV:

Sequential Systems:

Memory cells and Arrays, Clocking disciplines, Design, Power optimization, Design validation andtesting.

UNIT –V:

Floor Planning:

Floor planning methods, Global Interconnect, Floor Plan Design, Off-chip connections.

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems, K. Eshraghian Eshraghian. D, A. Pucknell, 2005,

PHI.

2. Modern VLSI Design – Wayne Wolf, 3 rd Ed., 1997, Pearson Education.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011.

2. Principals of CMOS VLSI Design – N.H.E Weste, K. Eshraghian, 2nd Ed., Addison Wesley.

(R18D6802) CPLD AND FPGA ARCHITECURES AND APPLICATIONS

UNIT-I:

Introduction to Programmable Logic Devices:

Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/Generic Array Logic; Complex

Programmable Logic Devices – Architecture of Xilinx Cool Runner XCR3064XL CPLD, CPLD

Implementation of a Parallel Adder with Accumulation

UNIT-II:

Field Programmable Gate Arrays:

Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs, Dedicated Specialized Components of FPGAs, Applications of FPGAs.

UNIT -III:

SRAM Programmable FPGAs:

Introduction, Programming Technology, Device Architecture, The Xilinx XC2000, XC3000 and

XC4000 Architectures.

UNIT -IV:

Anti-Fuse Programmed FPGAs:

Introduction, Programming Technology, Device Architecture, The Actel ACT1, ACT2 and ACT3 Architectures.

UNIT -V:

Design Applications:

General Design Issues, Counter Examples, A Fast Video Controller, A Position Tracker for a Robot Manipulator, A Fast DMA Controller, Designing Counters with ACT devices, Designing Adders and Accumulators with the ACT Architecture.

TEXT BOOKS:

1. Field Programmable Gate Array Technology - Stephen M. Trimberger, Springer International Edition.

2. Digital Systems Design - Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.

REFERENCE BOOKS:

1. Field Programmable Gate Arrays - John V. Oldfield, Richard C. Dorf, Wiley India.

2. Digital Design Using Field Programmable Gate Arrays - Pak K. Chan/Samiha Mourad, Pearson Low Price Edition.

3. Digital Systems Design with FPGAs and CPLDs - Ian Grout, Elsevier, Newnes.

4. FPGA based System Design - Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.

(R18D6803) EMBEDDED SYSTEM DESIGN

UNIT –I:

ARM Architecture:

ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupts and

Vector Table, Architecture Revision, ARM Processor Families.

UNIT –II:

ARM Programming Model – I:

Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions,

PSR Instructions, Conditional Instructions.

UNIT –III:

ARM Programming Model – II:

Thumb Instruction Set: Register Usage, Other Branch Instructions, Data Processing Instructions,

Single-Register and Multi Register Load-Store Instructions, Stack, Software Interrupt Instructions

UNIT –IV:

ARM Programming:

Simple C Programs using Function Calls, Pointers, Structures, Integer and Floating Point Arithmetic, Assembly Code using Instruction Scheduling, Register Allocation, Conditional Execution and Loops.

UNIT –V:

Memory Management:

Cache Architecture, Polices, Flushing and Caches, MMU, Page Tables, Translation, Access

Permissions, Context Switch.

TEXT BOOKS:

1. ARM Systems Developer's Guides- Designing & Optimizing System Software – Andrew N. Sloss, Dominic Symes, Chris Wright, 2008, Elsevier.

2. Professional Embedded ARM development-James A Langbridge, Wiley/Wrox

REFERENCE BOOKS:

1. Embedded Microcomputer Systems, Real Time Interfacing – Jonathan W. Valvano – Brookes / Cole, 1999, Thomas Learning.

2. ARM System on Chip Architecture, Steve Furber, 2nd Edition, Pearson

(R18D6807)VLSI SIGNAL PROCESSING

(ELECTIVE-I)

UNIT I:

Introduction To DSP Systems, Pipelining And Parallel Processing Of FIR Filters

Introduction to DSP systems – Typical DSP algorithms, Data flow and Dependence graphs - critical path, Loop bound, iteration bound, Longest path matrix algorithm,

Pipelining and Parallel processing of FIR filters, Pipelining and Parallel processing for low power.

UNIT II:

Retiming, Algorithmic Strength Reduction

Retiming – definitions and properties, Unfolding – an algorithm for unfolding, properties of unfolding, sample period reduction and parallel processing application, Algorithmic strength reduction in filters and transforms – 2-parallel FIR filter, 2-parallel fast FIR filter, DCT architecture, rank-order filters, Odd-Even merge-sort architecture, parallel rank-order filters.

UNIT III:

Fast Convolution, Pipelining and Parallel Processing Of IIR Filters

Fast convolution – Cook-Toom algorithm, modified Cook-Toom algorithm, Pipelined and parallel recursive filters – Look-Ahead pipelining in first-order IIR filters, Look-Ahead pipelining with power-of-2 decomposition, Clustered look-ahead pipelining, Parallel processing of IIR filters, combined pipelining and parallel processing of IIR filters.

UNIT IV:

Bit-Level Arithmetic Architectures

Bit-level arithmetic architectures – parallel multipliers with sign extension, parallel carry-ripple and carry-save multipliers, Design of Lyon's bit-serial multipliers using Horner's rule, bit-serial FIR filter, CSD representation, CSD multiplication using Horner's rule for precision improvement, Distributed Arithmetic fundamentals and FIR filters

UNIT V:

Numerical Strength Reduction, Synchronous, Wave and Asynchronous Pipelining

Numerical strength reduction – subexpression elimination, multiple constant multiplication, iterative matching, synchronous pipelining and clocking styles, clock skew in edge-triggered single phase clocking, two-phase clocking, wave pipelining. Asynchronous pipelining bundled data versus dual rail protocol.

REFERENCES:

1. Keshab K. Parhi, " VLSI Digital Signal Processing Systems, Design and implementation", Wiley, Interscience, 2007.

2. U. Meyer – Baese, " Digital Signal Processing with Field Programmable Gate Arrays", Springer, Second Edition, 2004

3. Mohammad Isamail and Terri Fiez, Analog VLSI signal and information processing,

McGraw Hill, 1994

(R18D6808) CMOS ANALOG INTEGRATED CIRCUIT DESIGN

(ELECTIVE-I)

UNIT -I: MOS Devices and Modeling:

The MOS Transistor, Passive Components- Capacitor & Resistor, Integrated circuit Layout, CMOSDevice Modeling - Simple MOS Large-Signal Model, Other Model Parameters, Small- Signal Model forthe MOS Transistor, Computer Simulation Models, Sub-threshold MOS Model.

UNIT -II: Analog CMOS Sub-Circuits: MOS Switch, MOS Diode, MOS Active Resistor, Current Sinks and Sources, Current Mirrors-Currentmirror with Beta Helper, Degeneration, Cascode current Mirror and Wilson Current Mirror, Current andVoltage References, Band gap Reference.

UNIT -III: CMOS Amplifiers: Inverters, Differential Amplifiers, Cascode Amplifiers, Current Amplifiers, Output Amplifiers, High Gain Amplifiers Architectures.

UNIT -IV: CMOS Operational Amplifiers: Design of CMOS Op Amps, Compensation of Op Amps, Design of Two-Stage Op Amps, Power-Supply Rejection Ratio of Two-Stage Op Amps, Cascode Op Amps, Measurement Techniques of OPAmp.

UNIT -V: Comparators: Characterization of Comparator, Two-Stage, Open-Loop Comparators, Other Open-Loop Comparators, Improving the Performance of Open-Loop Comparators, Discrete-Time Comparators.

TEXT BOOKS:

1. CMOS Analog Circuit Design - Philip E. Allen and Douglas R. Holberg, Oxford University

Press, International Second Edition/Indian Edition, 2010.

2. Analysis and Design of Analog Integrated Circuits- Paul R. Gray, Paul J. Hurst, S. Lewis and

R. G. Meyer, Wiley India, Fifth Edition, 2010.

REFERENCE BOOKS:

1. Analog Integrated Circuit Design- David A. Johns, Ken Martin, Wiley Student Edn, 2013.

2. Design of Analog CMOS Integrated Circuits- Behzad Razavi, TMH Edition.

3. CMOS: Circuit Design, Layout and Simulation- Baker, Li

(R18D6809) PROGRAMMING LANGUAGES FOR EMBEDDED SOFTWARE

(ELECTIVE-I)

UNIT I:

Embedded 'C' Programming

Bitwise operations, Dynamic memory allocation, OS services, Linked stack and queue, Sparse matrices, Binary tree, Interrupt handling in C, Code optimization issues, Writing LCD drives, LED drivers, Drivers for serial port communication, Embedded Software Development Cycle and Methods (Waterfall, Agile)

UNITII:

Object Oriented Programming

Introduction to procedural, modular, object-oriented and generic programming techniques,

Limitations of procedural programming, objects, classes, data members, methods, data encapsulation, data abstraction and information hiding, inheritance, polymorphism

UNIT III:

CPP Programming

'cin', 'cout', formatting and I/O manipulators, new and delete operators, Defining a class, data members and methods, 'this' pointer, constructors, destructors, friend function, dynamic memory allocation

UNIT IV:

Overloading, Inheritance & Templates

Need of operator overloading, overloading the assignment, overloading using friends, type conversions, single inheritance, base and derived classes, friend classes, types of inheritance, hybrid inheritance, multiple inheritance, virtual base class, polymorphism, virtual functions

Templates

Function template and class template, member function templates and template arguments, Exception Handling: syntax for exception handling code: try-catch- throw,

Multiple Exceptions.

UNIT V:

Scripting Languages

Overview of Scripting Languages – PERL, CGI, VB Script, Java Script,PERL: Operators, Statements Pattern Matching etc. Data Structures, Modules, Objects, Tied Variables, Inter process Communication Threads, Compilation & Line Interfacing.

TEXT BOOKS:

1. Michael J. Pont , “Embedded C”, Pearson Education, 2nd Edition, 2008

2. Randal L. Schwartz, “Learning Perl”, O’Reilly Publications, 6th Edition 2011

3. A. Michael Berman, “Data structures via C++”, Oxford University Press, 2002

4. Robert Sedgewick, “Algorithms in C++”, Addison Wesley Publishing Company, 1999

5. Abraham Silberschatz, Peter B, Greg Gagne, “Operating System Concepts”, John Willey

& Sons, 2005

(R18D6810) CMOS DIGITAL INTEGRATED CIRCUIT DESIGN

(ELECTIVE-II)

UNIT –I:

MOS Design:

Pseudo NMOS Logic – Inverter, Inverter threshold voltage, Output high voltage, Output Low voltage,Gain at gate threshold voltage, Transient response, Rise time, Fall time, Pseudo NMOS logic gates,Transistor equivalency, CMOS Inverter logic.

UNIT –II:

Combinational MOS Logic Circuits:

MOS logic circuits with NMOS loads, Primitive CMOS logic gates – NOR & NAND gate, ComplexLogic circuits design – Realizing Boolean expressions using NMOS gates and CMOS gates , AOI andOIA gates, CMOS full adder, CMOS transmission gates, Designing with Transmission gates.

UNIT –III:

Sequential MOS Logic Circuits:

Behavior of bistable elements, SR Latch, Clocked latch and flip flop circuits, CMOS D latch and edgetriggered flipflop.

UNIT –IV:

Dynamic Logic Circuits:

Basic principle, Voltage Bootstrapping, Synchronous dynamic pass transistor circuits, Dynamic CMOStransmission gate logic, High performance Dynamic CMOS circuits.

UNIT –V:

Semiconductor Memories:

Types, RAM array organization, DRAM – Types, Operation, Leakage currents in DRAM cell andrefresh operation, SRAM operation Leakage currents in SRAM cells, Flash Memory- NOR flash andNAND flash.

TEXT BOOKS:

1. Digital Integrated Circuit Design – Ken Martin, Oxford University Press, 2011.

2. CMOS Digital Integrated Circuits Analysis and Design – Sung-Mo Kang, Yusuf Leblebici,

TMH, 3 rd Ed., 2011.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC

Press, 2011

2. Digital Integrated Circuits – A Design Perspective, Jan M. Rabaey, AnanthaChandrakasan,

Borivoje Nikolic, 2 nd Ed., PHI.

(R18D6811)CAD OF DIGITAL SYSTEM

(ELECTIVE-II)

UNIT I:

VLSI Design Methodologies

Introduction to VLSI Design methodologies - Review of Data structures and algorithms - Review of VLSI Design automation tools - Algorithmic Graph Theory and Computational Complexity - Tractable and Intractable problems - general purpose methods for combinatorial optimization.

UNIT II

Design Rules

Layout Compaction - Design rules - problem formulation - algorithms for constraint graph compaction - placement and partitioning - Circuit representation - Placement algorithms - partitioning

UNIT III:

Floor Planning

Floor planning concepts - shape functions and floorplan sizing - Types of local routing problems - Area routing - channel routing - global routing - algorithms for global routing.

UNIT IV:

Simulation

Simulation - Gate-level modeling and simulation - Switch-level modeling and simulation - Combinational Logic Synthesis - Binary Decision Diagrams - Two Level Logic Synthesis.

UNIT V:

Modelling And Synthesis

High level Synthesis - Hardware models - Internal representation - Allocation assignment and scheduling - Simple scheduling algorithm - Assignment problem - High level transformations.

TEXT BOOKS:

1. S.H. Gerez, "Algorithms for VLSI Design Automation", John Wiley & Sons,2002. 2. N.A. Sherwani, "Algorithms for VLSI Physical Design Automation", Kluwer Academic Publishers, 2002

(R18D6812)SYSTEM DESIGN WITH EMBEDDED LINUX

(ELECTIVE-II)

UNIT I: Embedded OS (Linux) Internals

Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication - Semaphore, Pipes, FIFO, Shared Memory Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling.

Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network

UNIT II: Open source RTOS

Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Metric in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS.

UNIT III: Open Source RTOS Issues

POSIX standards, RTOS Issues - Selecting a Real Time Operating System, RTOS comparative study. Converting a normal Linux kernel to real time kernel, Xenomai basics, Overview of Open source RTOS for Embedded systems (Free RTOS/ Chibios-RT) and application development.

UNIT IV: VxWorks / Free RTOS

VxWorks/ Free RTOS Scheduling and Task Management - Realtime scheduling, Task Creation, Intertask Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems - General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral

UNIT V: Case study

Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board ().Testing a real time application on the board

TEXT BOOKS:

1. Essential Linux Device Drivers, Venkateswaran Sreekrishnan

2. Writing Linux Device Drivers: A Guide with Exercises, J. Cooperstein

3. Real Time Concepts for Embedded Systems – Qing Li, Elsevier

REFERENCE BOOKS:

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK

3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17the IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society

4. Real-time Systems – Jane Liu, PH 2000

5. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A

6. Structured Development for Real - Time Systems V1 : Introduction and Tools: Ward, Paul T & Mellor, Stephen J

7. Structured Development for Real - Time Systems V2 : Essential Modeling Techniques: Ward, Paul T & Mellor, Stephen J

8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J

9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H

10. Embedded Software Primer: Simon, David E.

11. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw

Hill

(R18DME51) NON-CONVENTIONAL ENERGY SOURCES

(OPEN ELECTIVE-I)

UNIT-I

Introduction: Energy Scenario, Survey of energy resources. Classification and need for conventional energy resources.

Solar Energy: The Sun-sun-Earth relationship, Basic matter to waste heat energy circuit, SolarRadiation, Attention, Radiation measuring instruments.

Solar Energy Applications: Solar water heating. Space heating, Active and passive heating, Energystorage, Selective surface, Solar stills and ponds, solar refrigeration, Photovoltaic generation.

UNIT -II

Geothermal Energy: Structure of earth, Geothermal Regions, Hot springs. Hot Rocks, HotAquifers. Analytical methods to estimate thermal potential. Harnessing techniques, Electricity generating systems.

UNIT-III

Direct Energy Conversion: Nuclear Fusion, Fusion reaction, P-P cycle, Carbon cycle,Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic, Thermionic and Thermoelectric generation and MHD generator.

Hydrogen Gas as Fuel: Production methods, Properties, I.C. Engines applications, Utilization strategy,Performances.

UNIT-IV

Bioenergy: Biomass energy sources. Plant productivity, Biomass wastes, aerobic and anaerobicbioconversion processes, Raw material and properties of bio-gas, Bio-gas plant technology and status, the energetic and economics of biomass systems, Biomass gasification

UNIT-V

Wind Energy: Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types,Betz model. Interference factor. Power coefficient, Torque coefficient and Thrust coefficient, Lift machines and Drag machines. Matching Electricity generation.**Energy from Oceans**: Tidal energy, Tides, Diurnal and semi-diurnal nature, Power from tides, WaveEnergy, Waves, Theoretical energy available. Calculation of period and phase velocity of waves, Wave power systems, submerged devices. Ocean thermal Energy, Principles, Heat exchangers, Pumping requirements, Practical considerations.

TEXTBOOKS:

1. Non-conventional Energy Sources / GD Rai/Khanna publications.
2. Non-Conventional Energy Sources and Utilisation (Energy Engineering)/ R KRajput/S.Chand.
3. Renewable Energy Sources /Twidell& Weir/Taylor and Francis/ 2nd special Indian edition.

REFERENCE BOOKS:

1. Renewable Energy Resources- Basic Principles and Applications/ G.N.Tiwari and M.K.GhosalNarosa Publications.
2. Renewable Energy Resources/ John Twidell& Tony Weir/Taylor & Francis/2nd edition.

3. Non Conventional Energy / K.Mittal/ Wheeler.

(R18DME52)INDUSTRIAL SAFETY

(OPEN ELECTIVE-I)

UNIT-I:

Industrial safety

Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

UNIT-II:

Fundamentals of maintenance engineering

Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

UNIT-III:

Wear and Corrosion and their prevention

Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv.Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

UNIT-IV:

Fault Tracing

Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic,automotive, thermal and electrical equipment's like, i. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler,vi. Electrical motors, Types of faults in machine tools and their general causes.

UNIT-V:

Periodic and preventive maintenance

Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance, Repair cycle concept and importance.

TEXTBOOKS:

1. Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.

2. Maintenance Engineering, H. P. Garg, S. Chand and Company.

3. Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.

4. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

(R18DME53)OPERATIONS RESEARCH

(OPEN ELECTIVE-I)

UNIT I:

Introduction to OR & Linear Programming

Evolution of OR, definition of OR, scope of OR, application areas of OR, steps (phases) in OR study, characteristics and limitations of OR, models used in OR, linear programming (LP) problem-formulation and solution by graphical method.

Solution Of Linear Programming Problems: The simplex method, canonical and standard form of an LP problem, slack, surplus and artificial variables, big M method and concept of duality, dual simplex method.

UNIT II

Transportation Problem

Formulation of transportation problem, types, initial basic feasible solution using different methods, optimal solution by MODI method, degeneracy in transportation problems, application of transportation problem concept for maximization cases, Assignment Problem- formulation, types, application to maximization cases and travelling salesman problem.

UNIT III:

Integer Programming

Pure and mixed integer programming problems, solution of Integer programming problems-Gomory's all integer cutting plane method and mixed integer method, branch and bound method, Zero-One programming,Pert-CPM Techniques:

Introduction, network construction - rules, Fulkerson's rule for numbering the events, AON and AOA diagrams; Critical path method to find the expected completion time of a project, floats; PERT for finding expected duration of an activity and project, determining the probability of completing a project, predicting the completion time of project; crashing of simple projects.

UNIT IV:

Queuing Theory

Queuing systems and their characteristics, Pure-birth and Pure-death models (only equations), empirical queuing models – M/M/1 and M/M/C models and their steady state performance analysis.

UNIT V:

Game Theory

Formulation of games, types, solution of games with saddle point, graphical method of solving mixed strategy games, dominance rule for solving mixed strategy games.

Sequencing: Basic assumptions, sequencing 'n' jobs on single machine using priority rules, sequencing using Johnson's rule-'n' jobs on two machines, 'n' jobs on three machines, 'n' jobs on 'm' machines. Sequencing two jobs on 'm' machines using graphical method.

TEXTBOOKS:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008

2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.

3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008

4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009

5. Pannerselvam, Operations Research: Prentice Hall of India 2010

6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

(R18DHS51) BUSINESS ANALYTICS

(OPEN ELECTIVE – I)

UNIT I:

Business Analytics

Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organization, competitive advantages of Business Analytics, Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modelling, sampling and estimation methods overview

UNIT II:

Trendiness and Regression Analysis

Modelling Relationships and Trends in Data, simple Linear Regression, Important Resources, Business Analytics Personnel, Data and models for Business, analytics, problem solving, Visualizing and Exploring Data, Business Analytics, Technology.

UNIT III:

Organization Structures of Business analytics:

Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes, Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics,analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

UNIT IV:

Forecasting Techniques

Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models.

Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

UNIT V:

Decision Analysis

Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making. Recent Trends in Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism

TEXT BOOKS:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G.Schniederjans, Christopher M. Starkey, Pearson FT Press.

2. Business Analytics by James Evans, persons Education.

(R18DCS51) Scripting Languages

(OPEN ELECTIVE I)

Objectives: The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance perl - finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming Php and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts

and Bolts Internet Programming, Security Issues, C Interface. Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.

2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.

3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.

2. Programming Python, M.Lutz, SPD.

3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.

4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.

5. Core Python Programming, Chun, Pearson Education.

6. Guide to Programming with Python, M.Dawson, Cengage Learning.

7. Perl by Example, E.Quigley, Pearson Education.

8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.

10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).

11. Perl Power, J.P.Flynt, Cengage Learning.

12. PHP Programming solutions, V.Vaswani, TMH.

(R18DAE51) Mathematical Modeling Techniques

(OPEN ELECTIVE I)

UNIT-I: **INTRODUCTION TO MODELING AND SINGULAR PERTURBATION METHODS**

Definition of a model, Procedure of modeling: problem identification, model formulation, reduction, analysis, Computation, model validation, Choosing the model, Singular Perturbations: Elementary boundary layer theory, Matched asymptotic expansions, Inner layers, nonlinear oscillations

UNIT-II: **VARIATIONAL PRINCIPLES AND RANDOM SYSTEMS**

Variational calculus: Euler's equation, Integrals and missing variables, Constraints and Lagrange multipliers, Variational problems: Optics-Fermat's principle, Analytical mechanics: Hamilton's principle, Symmetry: Noether's theorem, Rigid body motion, Random systems: Random variables, Stochastic processes, Monte Carlo method

UNIT-III: **FINITE DIFFERENCES: ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS**

ODE: Numerical approximations, Runge-Kutta methods, Beyond Runge-Kutta, PDE: Hyperbolic equations-waves, Parabolic equations-diffusion, Elliptic equations-boundary values, **CELLULAR AUTOMATA AND LATTICE GASES:** Lattice gases and fluids, Cellular automata and computing

UNIT- IV: **FUNCTION FITTING AND TRANSFORMS**

Function fitting: Model estimation, Least squares, Linear least squares: Singular value decomposition, Non-linear least squares: Levenberg-Marquardt method, Estimation, Fisher information, and Cramer-Rao inequality, Transforms:Orthogonal transforms, Fourier transforms, Wavelets, Principal components

FUNCTION FITTING ARCHITECTURES: Polynomials: Pade approximants, Splines, Orthogonal functions, Radial basis functions, Over-fitting, Neural networks: Back propagation, Regularization

UNIT-V: **OPTIMIZATION AND SEARCH:** Multidimensional search, Local minima, Simulated annealing, Genetic algorithms **FILTERING AND STATE ESTIMATION:** Matched filters, Wiener filters, Kalman filters, Non-linearity and entrainment, Hidden Markov models

TEXT BOOK:

1. *The Nature of Mathematical Modeling*, Neil Gershenfeld, Cambridge University Press, 2006, ISBN 0-521-57095-6

REFERENCE BOOKS:

1. *Mathematical Models in the Applied Sciences*, A. C. Fowler, Cambridge University Press, 1997, ISBN 0-521-46140-5
2. *A First Course in Mathematical Modeling*, F. R. Giordano, M.D. Weir and W.P. Fox, 2003, Thomson, Brooks/Cole Publishers
3. *Applied Numerical Modeling for Engineers*, Donald De Cogan, Anne De Cogan, Oxford University Press, 1997

(R18DEC51) Embedded Systems Programming

(OPEN ELECTIVE I)

Unit 1 - Embedded OS (Linux) Internals

Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication - Semaphore, Pipes, FIFO, Shared Memory

Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling.

Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network

Unit 2 – Open source RTOS

Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Matric in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS.

Unit 3 – Open Source RTOS Issues

POSIX standards, RTOS Issues - Selecting a Real Time Operating System, RTOS comparative study. Converting a normal Linux kernel to real time kernel, Xenomai basics.

Overview of Open source RTOS for Embedded systems (Free RTOS/ Chibios-RT) and application development.

Unit 4 – VxWorks / Free RTOS

VxWorks/ Free RTOS Scheduling and Task Management - Realtime scheduling, Task Creation, Intertask Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems - General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral

Unit 5 – Case study

Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board ().Testing a real time application on the board

TEXT BOOKS:

1. Essential Linux Device Drivers, Venkateswaran Sreekrishnan
2. Writing Linux Device Drivers: A Guide with Exercises, J. Cooperstein
3. Real Time Concepts for Embedded Systems – Qing Li, Elsevier

REFERENCES:

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill
2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK
3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17the IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society
4. Real-time Systems – Jane Liu, PH 2000
5. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A
6. Structured Development for Real - Time Systems V1 : Introduction and Tools: Ward, Paul T & Mellor, Stephen J
7. Structured Development for Real - Time Systems V2 : Essential Modeling Techniques: Ward, Paul T & Mellor, Stephen J
8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J
9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H
10. Embedded Software Primer: Simon, David E.
11. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

(R18D6881) VLSI LABORATORY

Note:

Minimum of 10 programs from Part –I and 2 programs from Part -II are to be conducted.

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design,Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification.

Part –I: VLSI Front End Design programs:

Programming can be done using any complier. Down load the programs on FPGA/CPLD boards and performance testing may be done using pattern generator (32 channels) and logic analyzer apart from verification by simulation with any of the front end tools.

1. HDL code to realize all the logic gates
2. Design and Simulation of adder, Serial Binary Adder, Multi Precession Adder, CarryLook Ahead Adder.
3. Design of 2-to-4 decoder
4. Design of 8-to-3 encoder (without and with parity)
5. Design of 8-to-1 multiplexer
6. Design of 4 bit binary to gray converter
7. Design of Multiplexer/ Demultiplexer, comparator
8. Design of Full adder using 3 modeling styles
9. Design of flip flops: SR, D, JK, T
10. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any sequencecounter
11. Design of a N- bit Register of Serial- in Serial –out, Serial in parallel out, Parallel in Serial out and Parallel in Parallel Out.
12. Design of Sequence Detector (Finite State Machine- Mealy and Moore Machines).
13. Design of 4- Bit Multiplier, Divider.
14. Design of ALU to Perform – ADD, SUB, AND-OR, 1's and 2's Compliment, multiplication and Division.
15. Design of Finite State Machine.

16. Implementing the above designs on Xilinx/Altera/Cypress/equivalent based FPGA/CPLD kits

Part –II: VLSI Back End Design programs:

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design/Transistor-level design/Hierarchical design/Verilog HDL or VHDL design, Logic synthesis, Simulation and verification, Scaling of CMOS Inverter for different technologies, study of secondary effects (temperature, power supply and process corners), Circuit optimization with respect to area,performance and/or power, Layout, Extraction of parasitic and back annotation, modifications in circuit parameters and layout consumption, DC/transient analysis, Verification of layouts (DRC, LVS).

1. Introduction to layout design rules
2. Layout, physical verification, placement & route for complex design, static timing Analysis, IR drops analysis and crosstalk analysis of the following:

- Basic logic gates
- CMOS inverter
- CMOS NOR/ NAND gates
- CMOS XOR and MUX gates
- CMOS 1-bit full adder
- Static / Dynamic logic circuit (register cell)
- Latch
- Pass transistorBasic logic gates

3. Layout of any combinational circuit (complex CMOS logic gate)- Learning about data paths

(R18DHS54)VALUE EDUCATION

(Audit Course I)

UNIT I:

Values and self-development

Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non-moral valuation. Standards and principles, Value judgements

UNIT II:

Importance of cultivation of values

Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness,

Honesty, Humanity. Power of faith, National Unity, Patriotism, Love for nature, Discipline

UNIT III:

Personality and Behavior Development

Soul and Scientific attitude, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness ,Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature

UNIT IV:

Character and Competence

Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence ,Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively

TEXT BOOKS:

1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

SEMESTER-II

(R18D6804) EMBEDDED REAL TIME OPERATING SYSTEMS

UNIT – I:
Introduction
Introduction to UNIX/LINUX, Overview of Commands, File I/O,(open, create, close, lseek, read,write), Process Control (fork, vfork, exit, wait, waitpid, exec.

UNIT - II:
Real Time Operating Systems
Brief History of OS, Defining RTOS, The Scheduler, Objects, Services, Characteristics of RTOS,Defining a Task asks States and Scheduling, Task Operations, Structure, Synchronization,
Communication and Concurrency.
Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use

UNIT - III:
Objects, Services and I/O
Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem

UNIT - IV:
Exceptions, Interrupts and Timers
Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines (ISR), Soft Timers, Operations.

UNIT - V:
Case Studies of RTOS
RT Linux, MicroC/OS-II, Vx Works, Embedded Linux, Tiny OS, and Basic Concepts of Android OS.

TEXT BOOKS:
1. Real Time Concepts for Embedded Systems – Qing Li, Elsevier, 2011
REFERENCE BOOKS:
1. Embedded Systems- Architecture, Programming and Design by Rajkamal, 2007, TMH.
2. Advanced UNIX Programming, Richard Stevens
3. Embedded Linux: Hardware, Software and Interfacing – Dr. Craig Hollabaugh

(R18D6805) CMOS MIXED SIGNAL CIRCUIT DESIGN

UNIT -I:

Switched Capacitor Circuits:

Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing,biquad filters.

UNIT -II:

Phased Lock Loop (PLL):

Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs- PFD/CP non-idealities,Jitter in PLLs, Delay locked loops, applications

UNIT -III:

Data Converter Fundamentals:

DC and dynamic specifications, Quantization noise, Nyquist rate D/A converters- Decoder based converters, Binary-Scaled converters, Thermometer-code converters, Hybrid converters

UNIT -IV:

Nyquist Rate A/D Converters:

Successive approximation converters, Flash converter, Two-step A/D converters, Interpolating A/D converters, Folding A/D converters, Pipelined A/D converters, Time-interleaved converters.

UNIT -V:

Oversampling Converters:

Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multibit quantizers, Delta sigma D/A

TEXT BOOKS:

1. Design of Analog CMOS Integrated Circuits- Behzad Razavi, TMH Edition, 2002
2. CMOS Analog Circuit Design - Philip E. Allen and Douglas R. Holberg, Oxford University Press,International Second Edition/Indian Edition, 2010.
3. Analog Integrated Circuit Design- David A. Johns,Ken Martin, Wiley Student Edition, 2013

REFERENCE BOOKS:

1. CMOS Integrated Analog-to- Digital and Digital-to-Analog converters-Rudy Van De Plassche,Kluwer Academic Publishers, 2003
2. Understanding Delta-Sigma Data converters-Richard Schreier, Wiley Interscience, 2005.
3. CMOS Mixed-Signal Circuit Design - R. Jacob Baker, Wiley Interscience, 2009.

(R18D6806) LOW POWER VLSI DESIGN

UNIT –I:

Fundamentals:

Need for Low Power Circuit Design, Sources of Power Dissipation – Switching Power Dissipation,Short Circuit Power Dissipation, Leakage Power Dissipation, Glitching Power Dissipation, ShortChannel Effects –Drain Induced Barrier Lowering and Punch Through, Surface Scattering, VelocitySaturation, Impact Ionization, Hot Electron Effect.

UNIT –II:

Low-Power Design Approaches:

Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach –Pipelining and Parallel Processing Approaches.

Switched Capacitance Minimization Approaches:

System Level Measures, Circuit Level Measures, Mask level Measures.

UNIT –III:

Low-Voltage Low-Power Adders:

Introduction, Standard Adder Cells, CMOS Adder's Architectures – Ripple Carry Adders, Carry Look-Ahead Adders, Carry Select Adders, Carry Save Adders, Low-Voltage Low-Power Design Techniques–Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

UNIT –IV:

Low-Voltage Low-Power Multipliers:

Introduction, Overview of Multiplication, Types of Multiplier Architectures, Braun Multiplier, Baugh-Wooley Multiplier, Booth Multiplier, Introduction to Wallace Tree Multiplier.

UNIT –V:

Low-Voltage Low-Power Memories:

Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Precharge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

TEXT BOOKS:

1. CMOS Digital Integrated Circuits – Analysis and Design – Sung-Mo Kang, Yusuf Leblebici,TMH, 2011.
2. Low-Voltage, Low-Power VLSI Subsystems – Kiat-Seng Yeo, Kaushik Roy, TMH Professional Engineering.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. Low Power CMOS Design – AnanthaChandrakasan, IEEE Press/Wiley International, 1998.
3. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons,2000.
4. Practical Low Power Digital VLSI Design – Gary K. Yeap, Kluwer Academic Press, 2002.
5. Low Power CMOS VLSI Circuit Design – A. Bellamour, M. I. Elamasri, Kluwer Academic Press, 1995.
6. Leakage in Nanometer CMOS Technologies – Siva G. Narendran, AnathaChandrakasan, Springer, 2005.

(R18D6813) ADHOC –WIRELESS NETWORKS
(ELECTIVE -III)

UNIT -I:

Wireless LANS and PANS: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards, HIPERLAN Standard, Bluetooth, Home RF.
AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks.

UNIT -II:
MAC Protocols: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT -III:
Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

UNIT –IV:
Transport Layer Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks.

UNIT –V:
Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:
1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan Sarangapani, CRC Press.
REFERENCE BOOKS:
1. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh , 1st Ed. Pearson Education.
2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.

(R18D6814)SOC DESIGN
(ELECTIVE – III)

UNIT I:
ASIC

Overview of ASIC types, design strategies, CISC, RISC and NISC approaches for SOC architectural issues and its impact on SoC design methodologies, Application Specific Instruction Processor (ASIP) concepts.

UNIT 2:
NISC

NISC Control Words methodology, NISC Applications and Advantages, Architecture Description Languages (ADL) for design and verification of Application Specific Instruction set Processors (ASIP), No-Instruction-Set-computer (NISC)- design flow, modeling NISC architectures and systems, use of Generic Netlist Representation - A formal language for specification, compilation and synthesis of embedded processors.

UNIT III:
Simulation

Different simulation modes, behavioural, functional, static timing, gate level, switch level,transistor/circuit simulation, design of verification vectors, Low power FPGA, Reconfigurable systems, SoC related modeling of data path design and control logic, Minimization of interconnects impact, clock tree design issues.

UNIT IV:
Low power SoC design / Digital system

Design synergy, Low power system perspective- power gating, clock gating, adaptive voltage scaling (AVS), Static voltage scaling, Dynamic clock frequency and voltage scaling (DCFS),building block optimization, building block memory, power down techniques, power consumption verification.

UNIT V:
Synthesis

Role and Concept of graph theory and its relevance to synthesizable constructs, Walks, trails paths, connectivity, components, mapping/visualization, nodal and admittance graph,Technology independent and technology dependent approaches for synthesis, optimization constraints, Synthesis report analysis, Single core and Multi core systems, dark silicon issues,HDL coding techniques for minimization of power consumption, Fault tolerant designs.Case study for overview of cellular phone design with emphasis on area optimization, speed improvement and power minimization.

TEXT BOOKS:

1. Hubert Kaeslin, “Digital Integrated Circuit Design: From VLSI Architectures to CMOS Fabrication”, Cambridge University Press, 2008.
2. B. Al Hashimi, “System on chip-Next generation electronics”, The IET, 2006
3. RochitRajsuman, “System-on- a-chip: Design and test”, Advantest America R & D Center, 2000
4. P Mishra and N Dutt, “Processor Description Languages”, Morgan Kaufmann, 2008
5. Michael J. Flynn and Wayne Luk, “Computer System Design: System-on-Chip”. Wiley,2011

(R18D6815)MEMORY TECHNOLOGIES

(ELECTIVE – III)

UNIT I:

Random Access Memory Technologies

Static Random Access Memories (SRAMs), SRAM Cell Structures, MOS SRAM Architecture, MOS SRAM Cell and Peripheral Circuit, Bipolar SRAM, Advanced SRAM Architectures,Application Specific SRAMs.

Unit II:

DRAM DESIGN

DRAMs, MOS DRAM Cell, BiCMOS DRAM, Error Failures in DRAM, Advanced DRAM Design and Architecture, Application Specific DRAMs.SRAM and DRAM Memory controllers.

Unit III:

Non-Volatile Memories

Masked ROMs, PROMs, Bipolar & CMOS PROM, EEPROMs, Floating Gate EPROM Cell, OTP EPROM, EEPROMs, Non-volatile SRAM, Flash Memories.

Unit IV:

Semiconductor Memory Reliability and Radiation Effects

General Reliability Issues,RAM Failure Modes and Mechanism, Nonvolatile Memory, Radiation Effects, SEP, Radiation Hardening Techniques. Process and Design Issues, Radiation Hardened Memory Characteristics, Radiation

Unit V:

Advanced Memory Technologies and High-density Memory Packing Technologies

Ferroelectric Random Access Memories (FRAMs), Gallium Arsenide (GaAs) FRAMs, Analog Memories, Magneto Resistive Random Access Memories (MRAMs), Experimental Memory Devices, Memory Hybrids (2D & 3D), Memory Stacks, Memory Testing and Reliability Issues, Memory Cards,High Density Memory Packaging

TEXT BOOKS:

1. Ashok K Sharma, “Advanced Semiconductor Memories: Architectures, Designs and Applications”, Wiley Interscience
2. Kiyoo Itoh, “VLSI memory chip design”, Springer International Edition
3. Ashok K Sharma,” Semiconductor Memories: Technology, Testing and Reliability , PHI

(R18D6816)PHYSICAL DESIGN AUTOMATION
(ELECTIVE- IV)

UNIT I:
Introduction to VLSI Design Methodologies
Design and Fabrication of VLSI Devices, Fabrication Process and its impact on Design.

UNIT II:
VLSI design automation tools
Data structures and basic algorithms, graph theory and computational complexity, tractable and intractable problems.

UNIT III:
General purpose methods for combinational optimization
Partitioning, floor planning and pin assignment, placement, routing. Concepts and Algorithms Modeling: Gate Level Modeling and Simulation, Switch level modeling and simulation, Basic issues and Terminology, Binary – Decision diagram, Two – Level Logic Synthesis.
Hardware Models: Internal representation of the input algorithm, Allocation, Assignment and Scheduling, Some Scheduling Algorithms, Some aspects of Assignment problem, High – level Transformations.

Unit 4:
Simulation
Logic synthesis, verification, high level Synthesis. FPGA technologies: Physical Design cycle for FPGA's partitioning and routing for segmented and staggered models

UNIT V:
MCM technologies
MCM physical design cycle, Partitioning, Placement – Chip array based and full custom approaches, Routing –Maze routing, Multiple stage routing, Topologic routing, Integrated Pin – Distribution and routing, routing and programmable MCM's.

TEXT BOOKS:

1. S.H.Gerez, "Algorithms for VLSI Design Automation", John Wiley 1999.
2. Naveed Sherwani, "Algorithms for VLSI Physical Design Automation" 3rd edition, Springer International Edition. REFERENCES 1. Hill & Peterson, "Computer Aided Logical Design with Emphasis on VLSI" Wiley,1993 2. Wayne Wolf, "Modern VLSI Design: Systems on silicon" Pearson Education Asia, 2nd Edition.

(R18D6817)COMMUNICATION BUSES AND INTERFACES
(ELECTIVE- IV)

Unit 1:

Serial Buses: Physical interface, Data and Control signals, features

Unit 2:
Limitations and applications of RS232, RS485, I2C, SPI

Unit 3:
CAN Architecture, Data transmission, Layers, Frame formats, applications

Unit 4:
PCIe - Revisions, Configuration space, Hardware protocols, applications

Unit 5:
USB - Transfer types, enumeration, Descriptor types and contents, Device driver
Data Streaming Serial Communication Protocol - Serial Front Panel Data Port (SFPDP) using fibre optic and copper cable

TEXT BOOKS:
1. Jan Axelson, "Serial Port Complete - COM Ports, USB Virtual Com Ports, and Ports for Embedded Systems ", Lakeview Research, 2nd Edition
2.Jan Axelson, "USB Complete", Penram Publications
3. Mike Jackson, Ravi Budruk, "PCI Express Technology", Mindshare Press
4. Wilfried Voss, "A Comprehensible Guide to Controller Area Network", Copperhill Media Corporation, 2nd Edition, 2005.
5. Serial Front Panel Draft Standard VITA 17.1 – 200x

(R18D6818) MULTIMEDIA AND SIGNAL CODING
(ELECTIVE-IV)

UNIT-I:

Introduction to Multimedia

Multimedia, World Wide Web, Overview of Multimedia Tools, Multimedia Authoring, Graphics/ Image Data Types, and File Formats.

Color in Image and Video: Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut Colors, White Point Correction, XYZ to RGB Transform, Transform with Gamma Correction, L*A*B* Color Model. Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Under Color Removal: CMYK System, Printer Gamuts, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, Ycbcr Color Model.

UNIT-II:

Video Concepts: Types of Video Signals, Analog Video, Digital Video.

Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT-III:

Compression Algorithms

Lossless Compression Algorithms: Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression.

Lossy Image Compression Algorithms: Transform Coding: KLT And DCT Coding, Wavelet Based Coding.

Image Compression Standards: JPEG and JPEG2000.

UNIT-IV:

Video Compression Techniques

Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and InterFrame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

UNIT-V:

Audio, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithms, MPEG-2 AAC, MPEG-4 Audio.

TEXT BOOKS:

1. Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2. Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st Edition, 2009.

REFERENCE BOOKS:

1. Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zorans. Bojkoric, Dragorad A. Milovanovic, 1st Edition, 2002.

2. Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3. Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition, 2003.
4. Digital Video Processing – A. Murat Tekalp, PHI, 1996.

Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson, 2002

(R18DME54) Composite Materials (OPEN ELECTIVE II)

UNIT–I: Introduction: Definition – Classification and characteristics of Composite materials, Advantages and application of composites. Functional requirements of reinforcement and matrix, Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II: **Reinforcements:** Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures, Isostrain and Isostress conditions.

UNIT – III: Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT–IV: Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection, Moulding, Properties and applications.

UNIT – V: Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:

1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W.Tasi.

(R18DME55) Waste to Energy (OPEN ELECTIVE II)

UNIT-I: Introduction to Energy from Waste

Classification of waste as fuel – Agro based, Forest

residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

UNIT-II: Biomass Pyrolysis

Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods -Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

UNIT-III: Biomass Gasification

Gasifiers – Fixed bed system – Downdraft and updraft gasifiers –Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

UNIT-IV: Biomass Combustion:

Biomass stoves – Improved chullahs, types, some exotic designs,Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design,construction and operation - Operation of all the above biomass combustors.

UNIT-V: Biogas

Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their Classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion -Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production -Urban waste to energy conversion - Biomass energy programme in India.

References:

1. Hand Book of Composite Materials-ed-Lubin.

2. Composite Materials – K.K.Chawla.

3. Composite Materials Science and Applications – Deborah D.L. Chung.

4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W.Tasi.

(R18DME56) Industrial Management (OPEN ELECTIVE II)

Objective:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT IA model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.

2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.

3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.

4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.

2. Fundamentals of Computer Security, Springer.

3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH

4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.

5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.

6. Principles of Information Security, Whitman, Thomson.

(R18DHS52)COST MANAGEMENT OF ENGINEERING PROJECTS
(OPEN ELECTIVE –II)

UNIT I:

Introduction and Overview of the Strategic Cost Management Process

Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunitycost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

UNIT II:

Project:

Meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member,Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control,Bar charts and Network diagram.

UNIT III:

Project commissioning

mechanical and process Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis.

UNIT IV:

Pricing strategies

Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis.

UNIT V:

Budgetary Control

Flexible Budgets, Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing. Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

TEXT BOOKS:

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting

(R18DCS52) Information Security (OPEN ELECTIVE II)

Objective:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.

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4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.

5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.

6. Principles of Information Security, Whitman, Thomson.

(R18DAE52) UNMANNED AERIAL VEHICLES (OPEN ELECTIVE II)

UNIT-I: INTRODUCTION TO UNMANNED AIRCRAFT SYSTEMS

Applications of UAS, categories of UAV systems, roles of unmanned aircraft, composition of UAV system.

UNIT-II: DESIGN OF UAV SYSTEMS-I

Introduction to design and selection of the systems-conceptual phase, preliminary design, detailed design; Aerodynamics and airframe configurations-Lift-induced Drag, Parasitic Drag, Rotary-wing Aerodynamics, Response to Air Turbulence, Airframe Configurations; Medium-range, Tactical Aircraft, Characteristics of Aircraft Types-Long-endurance, Long-range Role Aircraft, Medium-range, Tactical Aircraft, Close-range/Battlefield Aircraft, MUAV Types, MAV and NAV Types, UCAV, Novel Hybrid Aircraft Configurations, Aspects of Airframe Design: Scale Effects, Packaging Density, Aerodynamics, Structures and Mechanisms, Selection of power- plants, Modular Construction, Ancillary Equipment, Design for Stealth: Acoustic Signature, Visual Signature, Thermal Signature, Radio/Radar Signature, Payload Types: Non-dispensable and dispensable payloads.

UNIT-III: DESIGN OF UAV SYSTEMS-II

Communications-Communication Media, Radio Communication, Mid-air Collision (MAC) Avoidance, Communications Data Rate and Bandwidth Usage, Antenna Type; Control and Stability: HTOL Aircraft, Convertible Rotor Aircraft, Payload Control, Sensors, Autonomy; Navigation: NAVSTAR Global Positioning System (GPS), TACAN, LORAN C, Inertial Navigation, Radio Tracking, Way-point Navigation; Launch and Recovery.

Design for Reliability: Determination of the Required Level of Reliability, Achieving Reliability, Reliability Data Presentation, Multiplexed Systems, Reliability by Design, Design for Ease of Maintenance; Design for Manufacture and Development

UNIT-IV: THE DEVELOPMENT OF UAV SYSTEMS

System Development and Certification-System Development, Certification, Establishing Reliability; System Ground Testing: UAV Component Testing, UAV Sub- assembly and Sub- system Testing, Testing Complete UAV, Control Station Testing , Catapult Launch System Tests, Documentation; System In- flight Testing: Test Sites, Preparation for In-flight Testing, In- flight Testing, System certification.

UNIT-V: DEPLOYMENT AND FUTURE OF UAV SYSTEMS

Operational trials and full certification; UAV System Deployment- Network-centric Operations (NCO), Teaming with Manned and Other Unmanned System; Naval, arm and air force roles, civilian, paramilitary and commercial roles.

Text Books:

1. Reg Austin, Wiley, “Unmanned Aircraft Systems, UAVS Design and Deployment”, 2nd Edition, 2010.

Reference Books:

1. Richard K. Barnhart, Stephen B. Hottman, Douglas M. Marshall, Eric Shappee, (eds.), "Introduction to Unmanned Aircraft Systems", CRC Press, 2012.
2. Valavanis, Kimon P., Vachtsevanos, George J. "Handbook of Unmanned Aerial Vehicles" AIAA series, 3rd Edition, 2004.

(R18DHS53) RESEARCH METHODOLOGY
(OPEN ELECTIVE – II)

UNIT - I

Introduction: Research objective and motivation, Types of research, Research approaches, Significance, Research method vs. methodology, Research process.

UNIT - II

Formulating a research problem: Literature review, Formulation of objectives, Establishing Operational definitions, Identifying variables, constructing hypotheses.

UNIT - III

Research design and Data Collection: Need and Characteristics, Types of research design, Principles of Experimental research design, Method of data collection, Ethical issues in collecting data.

UNIT - IV

Sampling and Analysis of data: Need of Sampling, Sampling distributions, Central limit theorem, Estimation: mean and variance, Selection of sample size Statistics in research, Measures of Central tendency, Dispersion, asymmetry and relationships, Correlation and Regression analysis, Displaying data

UNIT - V

Hypothesis Testing: Procedure, Hypothesis testing for difference in mean, variance limitations, Chi-square test, Analysis of variance (ANOVA), Basic principles and techniques of writing a Research Proposal

Text Books:

1. R. C. Kothari, Research Methodology: Methods and Techniques, 2nd edition, New Age International Publisher, 2009

2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition, SAGE, 2005

References:

1. Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/>

2. (Electronic Version): StatSoft, Inc. (2012). Electronic Statistics Textbook. Tulsa, OK: StatSoft. WEB: http://www.statsoft.com/textbook/.(Printed Version): Hill, T. & Lewicki, P. (2007). STATISTICS: Methods and Applications. StatSoft, Tulsa, OK.

(R18D6882) EMBEDDED SYSTEMS LABORATORY

Note:
The following programs are to be implemented on ARM based Processors/Equivalent.
Minimum of 10 programs from Part –I and 6 programs from Part -II are to be conducted.

Part -I: The following Programs are to be implemented on ARM Processor

1. Simple Assembly Program for a. Addition | Subtraction | Multiplication | Division
b. Operating Modes, System Calls and Interrupts
c. Loops, Branches
2. Write an Assembly programs to configure and control General Purpose Input/Output (GPIO) port pins.
3. Write an Assembly programs to read digital values from external peripherals and execute them with the Target board.
4. Program for reading and writing of a file
5. Program to demonstrate Time delay program using built in Timer / Counter feature on IDE environment
6. Program to demonstrates a simple interrupt handler and setting up a timer
7. Program demonstrates setting up interrupt handlers. Press button to generate an interrupt and trace the program flow with debug terminal.
8. Program to Interface 8 Bit LED and Switch Interface
9. Program to implement Buzzer Interface on IDE environment
10. Program to Displaying a message in a 2 line x 16 Characters LCD display and verify the result in debug terminal.
11. Program to demonstrate I2C Interface on IDE environment
12. Program to demonstrate I2C Interface – Serial EEPROM
13. Demonstration of Serial communication. Transmission from Kit and reception from PC using Serial Port on IDE environment use debug terminal to trace the program.
14. Generation of PWM Signal
15. Program to demonstrate SD-MMC Card Interface.

Part -II:

Write the following programs to understand the use of RTOS with ARM Processor on IDE Environment using ARM Tool chain and Library:

1. Create an application that creates two tasks that wait on a timer whilst the main task loops.
2. Write an application that creates a task which is scheduled when a button is pressed, which illustrates the use of an event set between an ISR and a task
3. Write an application that Demonstrates the interruptible ISRs(Requires timer to have higher priority than external interrupt button)
4. a).Write an application to Test message queues and memory blocks.
b).Write an application to Test byte queues
5. Write an application that creates two tasks of the same priority and sets the time slice period to illustrate time slicing.

Interfacing Programs:

6. Write an application that creates a two task to Blinking two different LEDs at different timings
7. Write an application that creates a two task displaying two different messages in LCD display in two lines.
8. Sending messages to mailbox by one task and reading the message from mailbox by another task.
9. Sending message to PC through serial port by three different tasks on priority Basis.
10. Basic Audio Processing on IDE environment.

(R18DHS55)ENGLISH FOR RESEARCH PAPER WRITING
(AUDIT COURSE II)

UNIT I:

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and vagueness

UNIT II:

Clarifying Who Did What, Highlighting Your Findings, Hedging, and Critics in paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction

UNIT III:
Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT IV:
key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

UNIT V:

skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions: useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

TEXT BOOKS:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

MASTER OF TECHNOLOGY
In
COMPUTER SCIENCE AND ENGINEERING

ACADEMIC REGULATIONS

COURSE STRUCTURE AND SYLLABUS

Department of Computer Science and Engineering



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTUH, Hyderabad, Approved by AICTE - Accredited by NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally, Kompally, Secunderabad – 500100, Telangana State, India.

Contact Number: 7207034237, 9133555162, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

PRELIMINARY DEFINITIONS AND NOMENCLATURES

*"Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

*"Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

*"Commission" means University Grants Commission.

*"AICTE" means All India Council for Technical Education.

*"University" the Jawaharlal Nehru Technological University, Hyderabad.

*"College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

*"Program" means:

Master of Technology (M.Tech) degree program

PG Degree Program: M.Tech

*"Branch" means specialization in a program like M.Tech degree program in Electronics and Communication Engineering, M.Tech degree program in Computer Science and Engineering etc.

*"Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

*T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

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Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

Department of Computer Science and Engineering

Vision

- To acknowledge quality education and instill high patterns of discipline making the students technologically superior and ethically strong which involves the improvement in the quality of life in human race.

Mission

- To achieve and impart holistic technical education using the best of infrastructure, outstanding technical and teaching expertise to establish the students into competent and confident engineers.
- Evolving the center of excellence through creative and innovative teaching learning practices for promoting academic achievement to produce internationally accepted competitive and world class professionals.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1 – ANALYTICAL SKILLS

1. To facilitate the graduates with the ability to visualize, gather information, articulate, analyze, solve complex problems, and make decisions. These are essential to address the challenges of complex and computation intensive problems increasing their productivity.

PEO2 – TECHNICAL SKILLS

2. To facilitate the graduates with the technical skills that prepare them for immediate employment and pursue certification providing a deeper understanding of the technology in advanced areas of computer science and related fields, thus encouraging to pursue higher education and research based on their interest.

PEO3 – SOFT SKILLS

3. To facilitate the graduates with the soft skills that include fulfilling the mission, setting goals, showing self-confidence by communicating effectively, having a positive attitude, get involved in team-work, being a leader, managing their career and their life.

PEO4 – PROFESSIONAL ETHICS

To facilitate the graduates with the knowledge of professional and ethical responsibilities by paying attention to grooming, being conservative with style, following dress codes, safety codes and adapting themselves to technological advancements.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After the completion of the course, B. Tech Computer Science and Engineering, the graduates will have the following Program Specific Outcomes:

1. **Fundamentals and critical knowledge of the Computer System:-** Able to Understand the working principles of the computer System and its components , Apply the knowledge to build, asses, and analyze the software and hardware aspects of it .

2. **The comprehensive and Applicative knowledge of Software Development:** Comprehensive skills of Programming Languages, Software process models, methodologies, and able to plan, develop, test, analyze, and manage the software and hardware intensive systems in heterogeneous platforms individually or working in teams.

3. **Applications of Computing Domain & Research:** Able to use the professional, managerial, interdisciplinary skill set, and domain specific tools in development processes, identify the research gaps, and provide innovative solutions to them.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
12. **Life- long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

I Year I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/ P/ D	C	MAX MARKS	
						INT	EXT
1	R18D5801	Data Structures and Algorithms	3	-	3	30	70
2	R18D5802	Advanced Operating Systems	3	-	3	30	70
3	R18D5803	Computer System Design	3	-	3	30	70
4	R18D5807 R18D5808 R18D5809	ELECTIVE-I 1. Software Process and Project Management 2. Machine Learning 3. Wireless Sensor Networks	3	-	3	30	70
5	R18D5810 R18D5811 R18D5812	ELECTIVE-II 1. Distributed Systems 2. Software Architecture and Design Patterns 3. Data Science	3	-	3	30	70
6	OE I	OPEN ELECTIVE –I	3	-	3	30	70
7	R18D5881	Advanced Data Structures and Algorithms Lab	-	3	2	30	70
8	R18DHS54	Audit Course I - Value Education	2	-	-	50	-
Total			20	3	20	260	490

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE I	
Subject Code	Subject Name
R18DME51	Non-Conventional Energy Sources
R18DME52	Industrial Safety
R18DME53	Operations Research
R18DHS51	Business Analytics
R18DCS51	Scripting Languages
R18DAE51	Mathematical Modeling Techniques
R18DEC51	Embedded Systems Programming

I Year II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D5804	Network Programming	3	-	3	30	70
2	R18D5805	Advanced Databases	3	-	3	30	70
3	R18D5806	Internet Technologies and Services	3	-	3	30	70
4	R18D5813 R18D5814 R18D5815	ELECTIVE – III 1. Data Mining 2. Secure Software Design & Enterprise Computing 3. Computer Vision	3	-	3	30	70
5	R18D5816 R18D5817 R18D5818	ELECTIVE- IV 1. Human and Computer Interaction 2. Digital Forensics 3. Big Data Analytics	3	-	3	30	70
6	OE II	OPEN ELECTIVE- II	3	-	3	30	70
7	R18D5882	Internet Technologies and Services Lab	-	3	2	30	70
8	R18DHS55	Audit Course II - English for Research Paper Writing	2	-	-	50	
Total			20	3	20	260	490

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II	
Subject Code	Subject Name
R18DME54	Composite Materials
R18DME55	Waste to Energy
R18DME56	Industrial Management
R18DHS52	Cost Management of Engineering Projects
R18DCS52	Information Security
R18DAE52	Unmanned Aerial Vehicles
R18DEC52	Research Methodology

II Year I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D5883	Seminar I	-	-	2	50	-
2	R18D5891	Mini Project	-	-	4	100	-
3	R18D5892	Project Review I	-	-	8	100	-
Total			-	-	14	250	-

II Year II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D5884	Seminar II	-	-	2	50	-
2	R18D5893	Project Review II	-	-	8	100	-
3	R18D5894	Project Viva-voce	-	-	8	-	100
Total			-	-	18	150	100

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
M.Tech – I Year – I Sem(Computer Science & Engg.)

(R18D5801) DATA STRUCTURES AND ALGORITHMS

Objectives:

- The fundamental design, analysis, and implementation of basic data structures. Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction. Significance of algorithms in the computer field
- Various aspects of algorithm development Qualities of a good solution

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples. Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, Linked List, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching–Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable. Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, Threaded binary trees. Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-dfs and bfs, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT V

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees – Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, Tree Map Classes, Tries(examples only),Comparison of Search trees. Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition,
4. Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work,W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.TECH – I YEAR – I SEM(COMPUTER SCIENCE & ENGG.)

(R18D5802) ADVANCED OPERATING SYSTEMS

Objectives:

- To understand main components of Real time Operating system and their working
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of DOS To implement the working principles of OS
- To study different OS and compare their features

UNIT I

Real-time operating systems: Design issues, principles and case study.

UNIT II

Distributed operating system: Design issues, features and principles of working, case study.

UNIT III

Network operating system: Design issues, working principles and characteristic features, case study.

UNIT IV

Kernel development: Issues and development principles, case study.

UNIT V

Protection, privacy, access control and security issues, solutions.

TEXT BOOKS:

1. A.Silberschatz - Applied Operating System Concepts, Wiley, 2000.
2. Lubemir F Bic and Alan C. Shaw - Operating System Principles, Pearson Education, 2003.

REFERENCE BOOKS:

1. Operating Systems : Internal and Design Principles - Stallings, 6th ed., PE.
2. Modern Operating Systems, Andrew S Tanenbaum 3rd ed., PE.
3. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th ed.,, John Wiley
4. UNIX User Guide – Ritchie & Yates.
5. UNIX Network Programming - W.Richard Stevens ,1998, PHI.
6. The UNIX Programming Environment – Kernighan & Pike, PE.

(R18D5803) COMPUTER SYSTEM DESIGN

Objectives:

- To apply the fundamentals of Computer Systems Design and IT in devising IT solutions. To Design, simulate, and analyze digital hardware.
- To Interface between basic hardware and software computing systems. To Simulate and evaluate different computing architectures.

UNIT I

Computer structure – hardware, software, system software, Von-Neumann architecture – case study. IA -32 Pentium: registers and addressing, instructions, assembly language, program flow control, logic and shift/rotate instructions, multiply, divide MMX, SIMD instructions, I/O operations, subroutines.

Input/output organization, interrupts, DMA, Buses, Interface circuits, I/O interfaces, device drivers in windows, interrupt handlers

UNIT II

Processing Unit: Execution of a complete instruction, multiple bus organization, hardwired control, micro programmed control.

Pipelining: data hazards, instruction hazards, influence on instruction sets, data path & control consideration, and RISC architecture introduction.

UNIT – III

Memory: types and hierarchy, model level organization, cache memory, performance considerations, mapping, virtual memory, swapping, paging, segmentation, replacement policies.

UNIT – IV

Processes and Threads: processes, threads, inter process communication, classical IPC problems, Deadlocks.

UNIT – V

File system: Files, directories, Implementation, Unix file system

Security: Threats, intruders, accident data loss, basics of cryptography, user authentication.

TEXT BOOKS:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson /PHI
2. Morris Mano- Computer System Architecture –3rd Edition-Pearson Education.
3. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
4. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI

M.Tech – I Year – I Sem(Computer Science & Engg.)

(R18D5807) SOFTWARE PROCESS AND PROJECT MANAGEMENT
(ELECTIVE – I)

Objectives:

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

UNIT I

Software Process Maturity

Software maturity Framework**,** Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

Process Reference Models

Capability Maturity Model (CMM)**,** CMMI, PCMM, PSP, TSP.

UNIT II

Software Project Management Renaissance

Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

Life-Cycle Phases and Process artifacts

Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT III

Workflows and Checkpoints of process

Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments.

Process Planning

Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT IV

Project Organizations

Line-of- business organizations, project organizations, evolution of organizations, process automation.

Project Control and process instrumentation

The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, and metrics automation.

UNIT V

CCPDS-R Case Study and Future Software Project Management Practices

Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
2. Software Project Management, *Walker Royce,* Pearson Education.

REFERENCE BOOKS:

1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
3. Process Improvement essentials, James R. Persse, O'Reilly, 2006
4. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
5. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
6. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
7. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
8. The Art of Project Management, Scott Berkun, SPD, O'Reilly, 2011.
9. Applied Software Project Management, Andrew Stellman & Jennifer Greene, SPD, O'Reilly, rp2011.
10. Agile Project Management, Jim Highsmith, Pearson education, 2004.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.TECH – I YEAR – I SEM(COMPUTER SCIENCE & ENGG.)

(R18D5808) MACHINE LEARNING
(ELECTIVE –I)

Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT I

INTRODUCTION - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning

Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias

UNIT II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms

UNIT III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm

Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - **Instance-Based Learning**- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning
Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

UNIT IV
Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution
Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge

UNIT V
Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators,
Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming

TEXT BOOKS:
1. Machine Learning – Tom M. Mitchell, - MGH
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)

REFERENCE BOOKS:
1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

M.TECH – I YEAR – I SEM
(R18D5809) WIRELESS SENSOR NETWORKS
(ELECTIVE –I)

COURSE OBJECTIVE

- Architect sensor networks for various application setups.
- Devise appropriate data dissemination protocols and model links cost.
- Understanding of the fundamental concepts of wireless sensor networks and have a basic
- knowledge of the various protocols at various layers.
- Evaluate the performance of sensor networks and identify bottlenecks.

UNIT I

FUNDAMENTALS OF SENSOR NETWORKS Introduction and Overview - Overview of sensor network protocols, architecture, and applications, Challenges, Main features of WSNs; Research issues and trends, Platforms-Standards and specifications-IEEE802.15.4/Zigbee, Hardware: Telosb, Micaz motes ,Software: Overview of Embedded operating systems-Tiny OS, Introduction to Simulation tools-TOSSIM, OPNET, Ns-2.

UNIT II

COMMUNICATION CHARACTERISTICS AND DEPLOYMENT MECHANISMS Wireless Communication characteristics - Link quality, fading effects, Shadowing, Localization, Connectivity and Topology - Sensor deployment mechanisms, Coverage issues, Node discovery protocols.

UNIT III

MAC LAYER Fundamentals of Medium access protocol- Medium access layer protocols - Energy efficiency, Power allocation and Medium access control issues.

UNIT IV NETWORK LAYER AND TRANSPORT LAYER Network layer protocols-Data dissemination and processing, multichip and cluster based routing protocols- Energy efficient routing- Geographic routing, Transport layer- Transport protocol Design issues- Performance of Transport Control Protocols.

UNIT V

MIDDLEWARE AND SECURITY ISSUES Middleware and Application layer -Data dissemination, Data storage, Query processing, Security -Privacy issues, Attacks and Countermeasures

TEXT BOOKS:

1. W. Dargie and C. Poellabauer, “Fundamentals of Wireless Sensor Networks –Theory and Practice”, Wiley 2010

2. Kazem Sohraby, Daniel manoli , “Wireless Sensor networks- Technology, Protocols and Applications”, Wiley InterScience Publications 2010.

REFERENCE BOOKS:

1. Bhaskar Krishnamachari , “ Networking Wireless Sensors”, Cambridge University Press, 2005. 4. C.S Raghavendra, Krishna M.Sivalingam, Taieb znati , “Wireless Sensor Networks”, Springer Science 2004.,

2. Takahiro Hara,Vladimir I. Zadorozhny, and Erik Buchmann, “Wireless Sensor Network Technologies for the Information Explosion Era”, springer 2010

M.TECH – I YEAR – I SEM
(R18D5810) DISTRIBUTED SYSTEMS
(ELECTIVE –II)

COURSE OBJECTIVE

To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems.

UNIT 1:

INTRODUCTION

Data Fragmentation; Replication; and allocation techniques for DDBMS; Methods for designing and implementing DDBMS, designing a distributed relational database; Architectures for DDBMS: cluster federated, parallel databases and client server architecture.

UNIT 2:

DISTRIBUTED DATABASE DESIGN

Alternative design strategies; Distributed design issues; Fragmentation; Data allocation

SEMANTICS DATA CONTROL

View management; Data security; Semantic Integrity Control

QUERY PROCESSING ISSUES

Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition; Localization of distributed data

UNIT 3:

DISTRIBUTED QUERY OPTIMIZATION

Factors governing query optimization; Centralized query optimization; Ordering of fragment queries; Distributed query optimization algorithms

TRANSACTION MANAGEMENT

The transaction concept; Goals of transaction management; Characteristics of transactions; Taxonomy of transaction models

CONCURRENCY CONTROL

Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management

UNIT 4:

RELIABILITY

Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery protocols

Unit 5:

PARALLEL DATABASE SYSTEMS

Parallel architectures; parallel query processing and optimization; load balancing,
Mobile Databases, Distributed Object Management, Multi-databases,Spatial Database and Web Databases.

TEXT BOOKS:

1.Distributed Databases - Principles and Systems; Stefano Ceri; Guiseppe Pelagatti;TMH
2.Fundamental of Database Systems; Elmasri & Navathe; Pearson Education,Asia
3.Database System Concepts; Korth & Sudarshan; TMH

REFERENCE BOOKS:

1.Principles of Distributed Database Systems; M. Tamer Özsu; and Patrick Valduriez Prentice Hall
2.Data Base Management System; Leon & Leon; Vikas Publications
3.Introduction to Database Systems; Bipin C Desai; Galgotia
4. Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.

M.TECH – I YEAR – I SEM
(R18D5811) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
(ELECTIVE –II)

Objectives:

After completing this course, the student should be able to:

- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.
- To highlight the evolution of patterns.
- To how to add functionality to designs while minimizing complexity
- To understand what design patterns really are, and are not
- To learn about specific design patterns.
- To learn how to use design patterns to keep code quality high without overdesign.

UNIT I

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture

Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT II

Analyzing Architectures

Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

Moving from one system to many

Software Product Lines, Building systems from off the shelf components, Software architecture infuture.

UNIT III

Patterns

Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage.

Creational and Structural patterns

Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight.

UNIT IV

Behavioral patterns

Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

UNIT V

Case Studies

A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – acase study in product line development,

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall
1. PTR, 2001
2. Software Design, David Budgen, second edition, Pearson education, 2003
3. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
4. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
5. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
6. Design Patterns in C#, Steven John metsker, Pearson education, 2004.
7. Pattern Oriented Software Architecture, F.Buschmann & others, John Wiley & Sons.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.TECH – I YEAR – I SEM (COMPUTER SCIENCE & ENGG.)

(R18D5812)DATA SCIENCE

(ELECTIVE II)

COURSE OBJECTIVE

Provide you with the knowledge and expertise to become a proficient data scientist.

- Demonstrate an understanding of statistics and machine learning concepts that are vital for data science;
- Produce Python code to statistically analyze a dataset;
- Critically evaluate data visualizations based on their design and use for communicating stories from data;

UNIT 1:

Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.

UNIT 2:

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources

UNIT 3:

Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance,Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression,SVM, Naive Bayes.

UNIT 4:

Data visualisation:Introduction, Types of data visualisation,Data for visualisation:Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

UNIT 5:

Applications of Data Science,Technologies for visualisation, Bokeh (Python) Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

TEXT BOOKS:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly.

REFERENCE BOOKS:

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.

M.TECH – I YEAR – I SEM
(R18DME51) NON-CONVENTIONAL ENERGY SOURCES
(OPEN ELECTIVE I)

UNIT-I

Introduction: Energy Scenario, Survey of energy resources. Classification and need for conventional energy resources.

Solar Energy: The Sun-sun-Earth relationship, Basic matter to waste heat energy circuit, Solar Radiation, Attention, Radiation measuring instruments.

Solar Energy Applications: Solar water heating. Space heating, Active and passive heating, Energy storage, Selective surface, Solar stills and ponds, solar refrigeration, Photovoltaic generation.

UNIT -II

Geothermal Energy: Structure of earth, Geothermal Regions, Hot springs. Hot Rocks, Hot Aquifers. Analytical methods to estimate thermal potential. Harnessing techniques, Electricity generating systems.

UNIT-III

Direct Energy Conversion: Nuclear Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic, Thermionic and Thermoelectric generation and MHD generator.

Hydrogen Gas as Fuel: Production methods, Properties, I.C. Engines applications, Utilization strategy, Performances.

UNIT-IV

Bioenergy: Biomass energy sources. Plant productivity, Biomass wastes, aerobic and anaerobic bioconversion processes, Raw material and properties of bio-gas, Bio-gas plant technology and status, the energetic and economics of biomass systems, Biomass gasification

UNIT-V

Wind Energy: Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types, Betz model. Interference factor. Power coefficient, Torque coefficient and Thrust coefficient, Lift machines and Drag machines. Matching Electricity generation.

Energy from Oceans: Tidal energy, Tides, Diurnal and semi-diurnal nature, Power from tides, Wave Energy, Waves, Theoretical energy available. Calculation of period and phase velocity of waves, Wave power systems, submerged devices. Ocean thermal Energy, Principles, Heat exchangers, Pumping requirements, Practical considerations.

TEXTBOOKS:

1.Non-conventional Energy Sources / GD Rai/Khanna publications.
2.Non-Conventional Energy Sources and Utilisation (Energy Engineering)/ R KRajput/ S.Chand.
3.Renewable Energy Sources /Twidell & Weir/Taylor and Francis/ 2nd special Indian edition .

REFERENCE BOOKS:

1.Renewable Energy Resources- Basic Principles and Applications/ G.N.Tiwari and M.K.GhosalNarosa Publications.
2.Renewable Energy Resources/ John Twidell & Tony Weir/Taylor & Francis/2nd edition.
3.Non Conventional Energy / K.Mittal/ Wheeler.

M.TECH – I YEAR – I SEM
(R18DME52) INDUSTRIAL SAFETY
(OPEN ELECTIVE I)

Objectives:

- To explain the concept of various industrial safety methods.
- To outline division aspects measurements of safety performance .

UNIT-I :

Importance of Safety, health and environment. Health safety and environmental policy, fundamentals of safety, classification of accidents, Managements responsibility, objectives of safety management, National safety council, Employees state insurance act 1948, approaches to prevent accidents, principles of safety management, safety organization, safety auditing, maintenance of safety, measurements of safety performance, industrial noise and noise control, Industrial Psychology, Industrial accidents and prevention. Introduction to OSHAS 18001 AND OSHA.

UNIT II:

Process safety management (P.S.M) as per OSHA, legal aspects of safety, safety with respect to plant and machinery, the explosive act 1884, Petroleum act 1934, personal protective equipment, classification of hazards, protection of respiratory system, work permit system, hazards in refineries and process plants, safety in process plants, pollution in some typical process industry.

UNIT III:

Safe working practices, housekeeping, safe working environment, safety device and tools, precaution in use of ladders, safety instruction during crane operation, safety instruction for welding, burning and cutting and gas welding equipment, electrical safety, case studies, safety in use of electricity, electric shock phenomena, Occurrence of electric shock, medical analysis of electric shock and its effect, safety procedures in electric plants, installation of Earthing system,

UNIT IV:

Safety in hazardous area, hazard in industrial zones, classification of industrial Enclosures for gases and vapors. Mechanical, Chemical, Environmental and Radiation hazards, Machine guards and safety devices, slings, load limits, lifting tackles and lifting equipment, hydrostatic test, Chemical hazards, industrial toxicology, toxic chemicals and its harmful effects on humans, factors influencing the effect of toxic materials, Units of concentration, control measure, environmental hazards, devices for measuring radiation, safety analysis and risk analysis, risk management, First aid, Safety measures to avoid occupational diseases.

UNIT V

Factories act – 1948 Stuatutory authorities – inspecting staff, health, safety, provisions relating to hazardous processes,welfare, working hours, employment of young persons – special provisions – penalties and procedures- Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules – electricity act and rules

Text books :

1. Industrial safety management By: L.M. Deshmukh Publishers: Tata Megraw Hill ,New Delhi Year: 2006 Edition: First
2. The Factories Act 1948, Madras Book Agency, Chennai, 2000

References:

1. Industrial safety health and environment Management system By: R.K. Jain & Sunil S. Rao Publishers: Khanna Publishers Year: 2008 Edition: Second
2. The Indian boilers act 1923, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.
3.”Accident prevention manual for industrial operations”, N.S.C.,Chicago, 1982.
4. Industrial Safety and Environment by Amit Gupta
5. “Safety in Industry” N.V. Krishnan JaicoPublishery House, 1996.

Outcome of course:

- Educate students about how to reduce work place hazards and to encourage the standard of Safety ,Health & Environment programme , so as to aim 0% accidents and 100% safety in different industries in which Industrial Safety plays an important role.

This has the blending mixture of both Learning and Skills.

M.TECH – I YEAR – I SEM
(R18DME53) OPERATIONS RESEARCH
(OPEN ELECTIVE I)

Objectives:

- To familiarize the students with the use of practice oriented mathematical applications for optimization functions in an organization.
- To familiarize the students with various tools of optimization, probability, statistics and simulation,
- To applicable in particular scenarios in industry for better management of various resources.

UNIT–I

Introduction: Development – Definition– Characteristics and Phases – Types of models – operation Research models– applications.

Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method.

UNIT–II

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

Sequencing – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

UNIT–III

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

Theory of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT–IV

Waiting Lines: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

UNIT–V

Dynamic Programming: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Simulation Languages.

TEXT BOOKS :

1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Hiller &Libermann (TMH).
3. Introduction to O.R /Taha/PHI

REFERENCE BOOKS:

1. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson . Education.
2. Operations Research / R.Pannerselvam,PHI Publications.
3. Operation Research /J.K.Sharma/MacMilan.

OUTCOMES:

- Student will be able to Illustrate the need to optimally utilize the resources in various types of industries.
- Apply and analyze mathematical optimization functions to various applications.
- Demonstrate cost effective strategies in various applications in industry.

6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

M.TECH – I YEAR – I SEM
(R18DHS51) BUSINESS ANALYTICS
(OPEN ELECTIVE I)

Learning Objective: To understand the importance of ever-increasing volume, variety and velocity of data in organization and application of data analytical tools for decision making.

Learning Outcome: Students will be able to understand a) Importance of Analytics b) Understanding the analytical tools c) Application of Analytical tools to solve business problems.

UNIT I:

Business Analytics

Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organization, competitive advantages of Business Analytics, Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modelling, sampling and estimation methods overview

UNIT II:

Trendiness and Regression Analysis

Modelling Relationships and Trends in Data, simple Linear Regression, Important Resources, Business Analytics Personnel, Data and models for Business, analytics, problem solving, Visualizing and Exploring Data, Business Analytics, Technology.

UNIT III:

Organization Structures of Business analytics:

Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes, Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics,analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

UNIT IV:

Forecasting Techniques

Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models.

Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

UNIT V:

Decision Analysis

Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making. Recent Trends in Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism

TEXT BOOKS:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G.Schniederjans, Christopher M. Starkey, Pearson FT Press.
2. Business Analytics by James Evans, persons Education.

M.TECH – I YEAR – I SEM
(R18DCS51) SCRIPTING LANGUAGES
(OPEN ELECTIVE I)

Objectives: The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL-Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance perl - finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming Php and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

M.TECH – I YEAR – I SEM
(R18DAE51) MATHEMATICAL MODELING TECHNIQUES
(OPEN ELECTIVE I)

UNIT-I:

INTRODUCTION TO MODELING AND SINGULAR PERTURBATION METHODS

Definition of a model, Procedure of modeling: problem identification, model formulation, reduction, analysis, Computation, model validation, Choosing the model, Singular Perturbations: Elementary boundary layer theory, Matched asymptotic expansions, Inner layers, nonlinear oscillations

UNIT-II:

VARIATIONAL PRINCIPLES AND RANDOM SYSTEMS

Variational calculus: Euler's equation, Integrals and missing variables, Constraints and Lagrange multipliers, Variational problems: Optics-Fermat's principle, Analytical mechanics: Hamilton's principle, Symmetry: Noether's theorem, Rigid body motion, Random systems: Random variables, Stochastic processes, Monte Carlo method

UNIT-III:

FINITE DIFFERENCES: ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

ODE: Numerical approximations, Runge-Kutta methods, Beyond Runge-Kutta, PDE: Hyperbolic equations-waves, Parabolic equations-diffusion, Elliptic equations-boundary values, **CELLULAR AUTOMATA AND LATTICE GASES:** Lattice gases and fluids, Cellular automata and computing

UNIT- IV:

FUNCTION FITTING AND TRANSFORMS

Function fitting: Model estimation, Least squares, Linear least squares: Singular value decomposition, Non-linear least squares: Levenberg-Marquardt method, Estimation, Fisher information, and Cramer-Rao inequality, Transforms:Orthogonal transforms, Fourier transforms, Wavelets, Principal components

FUNCTION FITTING ARCHITECTURES: Polynomials: Pade approximants, Splines, Orthogonal functions, Radial basis functions, Over-fitting, Neural networks: Back propagation, Regularization

UNIT-V:

OPTIMIZATION AND SEARCH: Multidimensional search, Local minima, Simulated annealing, Genetic algorithms **FILTERING AND STATE ESTIMATION:** Matched filters, Wiener filters, Kalman filters, Non-linearity and entrainment, Hidden Markov models

TEXT BOOK:

1. *The Nature of Mathematical Modeling*, Neil Gershenfeld, Cambridge University Press, 2006, ISBN 0-521-57095-6

REFERENCE BOOKS:

1. *Mathematical Models in the Applied Sciences*, A. C. Fowler, Cambridge University Press, 1997, ISBN 0-521-46140-5
2. *A First Course in Mathematical Modeling*, F. R. Giordano, M.D. Weir and W.P. Fox, 2003, Thomson, Brooks/Cole Publishers
3. *Applied Numerical Modeling for Engineers*, Donald De Cogan, Anne De Cogan, Oxford,

M.TECH – I YEAR – I SEM
(R18DEC51) EMBEDDED SYSTEMS PROGRAMMING
(OPEN ELECTIVE I)

Unit 1

Embedded OS (Linux) Internals

Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication - Semaphore, Pipes, FIFO, Shared Memory

Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling.

Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network

Unit 2

Open source RTOS

Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Matric in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS.

Unit 3

Open Source RTOS Issues

POSIX standards, RTOS Issues - Selecting a Real Time Operating System, RTOS comparative study. Converting a normal Linux kernel to real time kernel, Xenomai basics.

Overview of Open source RTOS for Embedded systems (Free RTOS/ Chibios-RT) and application development.

Unit 4

VxWorks / Free RTOS

VxWorks/ Free RTOS Scheduling and Task Management - Realtime scheduling, Task Creation, Intertask Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems - General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral

Unit 5

Case study

Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board ().Testing a real time application on the board

TEXT BOOKS:

1. Essential Linux Device Drivers, Venkateswaran Sreekrishnan
2. Writing Linux Device Drivers: A Guide with Exercises, J. Cooperstein
3. Real Time Concepts for Embedded Systems – Qing Li, Elsevier

REFERENCES:

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill
2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK
3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17the IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society
4. Real-time Systems – Jane Liu, PH 2000
5. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A
6. Structured Development for Real - Time Systems V1 : Introduction and Tools: Ward, Paul T &

Mellor, Stephen J
7. Structured Development for Real - Time Systems V2 : Essential Modeling Techniques: Ward, Paul T & Mellor, Stephen J
8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J
9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H
10. Embedded Software Primer: Simon, David E.
11. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

M.TECH – I YEAR – I SEM

(R18D5881) ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.

Sample Problems on Data structures:

1) Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
   a) Linear search b) Binary search
2) Write Java programs to implement the following using arrays and linked lists
   a) List ADT
3) Write Java programs to implement the following using an array.
   a) Stack ADT b) Queue ADT
4) Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5) Write a Java program to implement circular queue ADT using an array.
6) Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7) Write Java programs to implement the following using a singly linked list.
   a) Stack ADT b) Queue ADT
8) Write Java programs to implement the deque (double ended queue) ADT using
   a) Array b) Singly linked list c) Doubly linked list.
9) Write a Java program to implement priority queue ADT.
10) Write a Java program to perform the following operations:
    a) Construct a binary search tree of elements.
    b) Search for a key element in the above binary search tree.
    c) Delete an element from the above binary search tree.
11) Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
12) Write a Java program to implement Dijkstra's algorithm for Single source shortest
13) path problem.
14) Write Java programs that use recursive and non-recursive functions to traverse the
15) given binary tree in
    a) Preorder b) Inorder c) Postorder.
16) Write Java programs for the implementation of bfs and dfs for a given graph.
17) Write Java programs for implementing the following sorting methods:
    a) Bubble sort d) Merge sort g) Binary tree sort
    b) Insertion sort e) Heap sort
    c) Quick sort f) Radix sort
18) Write a Java program to perform the following operations:

a) Insertion into a B-tree b) Searching in a B-tree

19) Write a Java program that implements Kruskal's algorithm to generate minimum cost

20) spanning tree.

21) Write a Java program that implements KMP algorithm for pattern matching

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.
8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.
10. Java Programming, D.S.Malik,Cengage Learning.

A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group.

(Note: Use packages like java.io, java.util, etc)

M.TECH – I YEAR – I SEM
(R18DHS54)VALUE EDUCATION
(AUDIT COURSE I)

UNIT I:

Values and self-development

Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non-moral valuation. Standards and principles, Value judgements

UNIT II:

Importance of cultivation of values

Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity. Power of faith, National Unity, Patriotism, Love for nature, Discipline

UNIT III:

Personality and Behavior Development

Soul and Scientific attitude, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness ,Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature

UNIT IV:

Character and Competence

Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence ,Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively

TEXT BOOKS:

1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

M.TECH – I YEAR – II SEM
(R18D5804) NETWORK PROGRAMMING

Objectives:

- Computer network programming involves writing computer programs that enable processes to communicate with each other across a computer network
- **Network programming is client–server programming**
- Interprocess communication, even if it is bidirectional, cannot be implemented in a perfectly symmetric way: to establish a communication channel between two processes, one process must take the initiative, while the other is waiting for it. Therefore, network programming unavoidably assumes a client–server model: The process initiating the communication is a client, and the process waiting for the communication to be initiated is a server. The client and server processes together form a distributed system. In a peer-to-peer communication, the program can act both as a client and a server.

UNIT – I

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities. Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples. Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

UNIT - II

Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lockf and fcntl functions, file permissions- chmod, fchmod, file ownership-chown, lchown , fchown, linkssoft links and hard links – symlink, link, unlink. File and Directory management – Directory contents, Scanning Directories- Directory file APIs. Process- Process concept, Kernel support for process, process attributes. Process control – process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT - III

Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory. Message Queues-Kernel support for messages, UNIX system V APIs for messages, client/server example. Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT – IV

Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, Client/Server Example. Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model, Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented - Communication, Socket system calls for Connectionless-Communication, Example-Client/Server Programs- Single Server-Client connection, Multiple simultaneous clients, Socket options – setsockopt, getsockopt, fcntl.

UNIT-V

Network Programming in Java-Network basics, TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI.(Units II,III,IV)
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
3. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.(Unit V)
4. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)
5. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
5. Unix Network Programming The Sockets Networking API, Vol.-I,W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
6. Unix Internals, U.Vahalia, Pearson Education.
7. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
8. C Programming Language, Kernighan and Ritchie, PHI

M.TECH – I YEAR – II SEM
(R18D5805) ADVANCED DATABASES

Objectives:

By the end of the course, you will know:

- History and Structure of databases
- How to design a database
- How to convert the design into the appropriate tables
- Handling Keys appropriately
- Enforcing Integrity Constraints to keep the database consistent
- Normalizing the tables to eliminate redundancies
- Querying relational data
- Optimizing and processing the queries
- Storage Strategies for easy retrieval of data through index
- Triggers, Procedures and Cursors ,Transaction Management
- Distributed databases management system concepts and Implementation

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL,DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER diagrams,. Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers

UNIT II

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT III

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL. Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking. Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT IV

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks. Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

UNIT V

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures,

Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition,2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition. Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date,Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database-Principles, Programming, andPerformance, P.O'Neil&E.O'Neil, 2nd ed., ELSEVIER
6. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.

M.TECH – I YEAR – II SEM
(R18D5806) INTERNET TECHNOLOGIES AND SERVICES

Objective:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. S/he should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML5, CSS3, Javascript, Ajax, JQuery and JSON

Server Side: Servlets, JSP

Database: MySQL with Hibernate and Connection Pooling

Framework: Struts with validation framework, Internationalization (I18N)

SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT I

Client Side Technologies:

Overview of HTML - Common tags, XHTML, capabilities of HTML5 Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS, Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM

(Browser/Document Object Model), accessing elements by ID, Objects in JavaScript

Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events Simplifying scripting with JQuery, JASON for Information exchange.

UNIT II

Introduction to Java Servlets:

Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions Steps involved in Deploying an application Database Access with JDBC and Connection Pooling Introduction to XML, XML Parsing with DOM and SAX Parsers in Java

Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it. Introduction to Hibernate

UNIT III

Introduction to JSP:

JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP

UNIT IV

Introduction to Struts Framework:

Introduction to MVC architecture, Anatomy of a simple struts2 application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT V

Service Oriented Architecture and Web Services

Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA Introduction to Web Services– The definition of web services, basic operational model of web services, basic steps of implementing web services.

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, Describing Web Services –Web Services life cycle, anatomy of WSDL

Introduction to Axis– Installing axis web service framework, deploying a java web service on axis. Web Services Interoperability – Creating java and .Net client applications for an Axis Web Service

(Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis)

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .
2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009
7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).
7. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett ,WROX.

M.TECH – I YEAR – II SEM
(R18D5813) DATA MINING
(ELECTIVE –III)

Objectives:

- To develop the abilities of critical analysis to data mining systems and applications.
- To implement practical and theoretical understanding of the technologies for data mining
- To understand the strengths and limitations of various data mining models;

UNIT-I

Data mining Overview and Advanced Pattern Mining

Data mining tasks – mining frequent patterns, associations and correlations, classification and regression for predictive analysis, cluster analysis , outlier analysis; advanced pattern mining in multilevel, multidimensional space – mining multilevel associations, mining multidimensional associations, mining quantitative association rules, mining rare patterns and negative patterns.

UNIT-II

Advance Classification

Classification by back propagation, support vector machines, classification using frequent patterns, other classification methods – genetic algorithms, roughest approach, fuzz>set approach;

UNIT-III

Advance Clustering

Density - based methods –DBSCAN, OPTICS, DENCLUE; Grid-Based methods – STING, CLIQUE; Exception – maximization algorithm; clustering High- Dimensional Data; Clustering Graph and Network Data.

UNIT-IV

Web and Text Mining

Introduction, web mining, web content mining, web structure mining, we usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

UNIT-V

Temporal and Spatial Data Mining

Introduction; Temporal Data Mining – Temporal Association Rules, Sequence Mining, GSP algorithm, SPADE, SPIRIT Episode Discovery, Time Series Analysis, Spatial Mining – Spatial Mining Tasks, Spatial Clustering. Data Mining Applications.

TEXT BOOKS:

1. Data Mining Concepts and Techniques, Jiawei Hang Micheline Kamber, Jian pei, Morgan Kaufmannn.
2. Data Mining Techniques – Arun K pujari, Universities Press.

REFERENCE BOOKS:

1. Introduction to Data Mining – Pang-Ning Tan, Vipin kumar, Michael Steinbach, Pearson.
2. Data Mining Principles & Applications – T.V Sveresh Kumar, B.Esware Reddy, Jagadish S Kalimani, Elsevier.

M.TECH – I YEAR – II SEM
(R18D5814)SECURE SOFTWARE DESIGN & ENTERPRISE COMPUTING
(ELECTIVE –III)

COURSE OBJECTIVE:

- To fix software flaws and bugs in various software.
- To make students aware of various issues like weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic
- Techniques for successfully implementing and supporting network services on an enterprise scale and heterogeneous systems environment.
- Methodologies and tools to design and develop secure software containing minimum vulnerabilities and flaws.

UNIT 1:

Secure Software Design

Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Perform security testing and quality assurance.

UNIT 2:

Enterprise Application Development Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, Design and develop a multi-tier solution to a problem using technologies used in enterprise system, Present software solution.

UNIT 3:

Enterprise Systems Administration Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/Clustering/Web/Email).

UNIT 4:

Obtain the ability to manage and troubleshoot a network running multiple services, Understand the requirements of an enterprise network and how to go about managing them.

UNIT 5:

Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws.

Case study of DNS server, DHCP configuration and SQL injection attack.

Text Books:

1. Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett
2. Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley.

M.Tech – I Year – II Sem
(R18D5815)Computer Vision
(ELECTIVE –III)

COURSE OBJECTIVE

- Be familiar with both the theoretical and practical aspects of computing with images.
- Have described the foundation of image formation, measurement, and analysis.
- Understand the geometric relationships between 2D images and the 3D world.
- Grasp the principles of state-of-the-art deep neural networks.

UNIT 1:

Overview, computer imaging systems, lenses, Image formation and sensing,
Image analysis, pre-processing and Binary image analysis

UNIT 2:

Edge detection, Edge detection performance, Hough transform, corner detection

UNIT 3:

Segmentation, Morphological filtering, Fourier transform

UNIT 4:

Feature extraction, shape, histogram, color, spectral, texture, using CVIPtools,
Feature analysis, feature vectors, distance /similarity measures, data preprocessing

UNIT 5:

Pattern Analysis:
Clustering: K-Means, K-Medoids, Mixture of Gaussians
Classification: Discriminant Function, Supervised, Un-supervised, Semisupervised
Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA,
ICA, and Non-parametric methods.
Recent trends inActivity Recognition, computational photography, Biometrics.

Text Books:

1. Computer Vision: Algorithms and Applications by Richard Szeliski.
2. Deep Learning, by Goodfellow, Bengio, and Courville.
3. Dictionary of Computer Vision and Image Processing, by Fisher et al.

M.TECH – I YEAR – II SEM
(R18D5816)HUMAN AND COMPUTER INTERACTION (ELECTIVE –IV)

COURSE OBJECTIVE

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Be aware of mobile Human Computer interaction.
- Learn the guidelines for user interface.

Unit 1:

Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

Unit 2:

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

Unit 3:

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

Unit 4:

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Unit 5:

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.
Recent Trends: Speech Recognition and Translation, Multimodal System

Text Books:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, 3rd Edition, Pearson Education, 2004 (UNIT I , II & III)
2. Brian Fling, “Mobile Design and Development”, First Edition , O Reilly Media Inc., 2009
3. Bill Scott and Theresa Neil, “Designing Web Interfaces”, First Edition, O Reilly, 2009.(UNIT-V)

M.TECH – I YEAR – II SEM

(R18D5817)DIGITAL FORENSICS (ELECTIVE –IV)

COURSE OBJECTIVE:

- Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
- Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
- Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools
- E-evidence collection and preservation, investigating operating systems and file systems,network forensics, art of steganography and mobile device forensics

UNIT 1:

Digital Forensics Science: Forensics science, computer forensics, and digital forensics.Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, holistic approach to cyber-forensics

Unit 2:

Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.

Unit 3:

Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.

Unit 4:

Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case, Network Forensics: open-source security tools for network forensic analysis, requirements for preservation of network data.

Unit 5:

Mobile Forensics: mobile forensics techniques, mobile forensics tools. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence

Text Books:

1. John Sammons, The Basics of Digital Forensics, Elsevier
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications

M.TECH – I YEAR – II SEM
(R18D5818)BIG DATA ANALYTICS (ELECTIVE –IV)

Objectives:

- To understand about big data
- To learn the analytics of Big Data
- To Understand the MapReduce fundamentals

Unit I

Big Data Analytics : What is big data, History of Data Management ; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics:What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

Unit II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics; Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

Unit III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS;

Unit IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

Unit V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets; Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS:

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black BookTM , DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, " Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, " Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

M.TECH – I YEAR – II SEM
(R18DME54) COMPOSITE MATERIALS (OPEN ELECTIVE II)

UNIT–I:

Introduction:

Definition – Classification and characteristics of Composite materials,Advantages and application of composites. Functional requirements of reinforcement and matrix,Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite
performance.

UNIT – II:

Reinforcements

Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures, Isostrain and Isostress conditions.

UNIT – III:

Manufacturing of Metal Matrix Composites:

Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT–IV:

Manufacturing of Polymer Matrix Composites:

Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection, Moulding, Properties and applications.

UNIT – V:

Strength

Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using
caplet plots; stress concentrations.

TEXT BOOKS:

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West
Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R.
Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:

1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W.Tasi.

M.TECH – I YEAR – II SEM
(R18DME55) WASTE TO ENERGY (OPEN ELECTIVE II)

UNIT-I:

Introduction to Energy from Waste

Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

UNIT-II:

Biomass Pyrolysis

Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods -Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

UNIT-III:

Biomass Gasification

Gasifiers – Fixed bed system – Downdraft and updraft gasifiers –Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

UNIT-IV:

Biomass Combustion:

Biomass stoves – Improved chullahs, types, some exotic designs,Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design,construction and operation - Operation of all the above biomass combustors.

UNIT-V:

Biogas

Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their Classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion -Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production -Urban waste to energy conversion - Biomass energy programme in India.

References:

1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W.Tasi.

M.TECH – I YEAR – II SEM
(R18DME56) INDUSTRIAL MANAGEMENT (OPEN ELECTIVE II)

Objective:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

M.TECH – I YEAR – II SEM

(R18DHS52) COST MANAGEMENT OF ENGINEERING PROJECTS (OPEN ELECTIVE II)

UNIT I:

Introduction and Overview of the Strategic Cost Management Process

Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunitycost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

UNIT II:

Project:

Meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member,Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control,Bar charts and Network diagram.

UNIT III:

Project commissioning

mechanical and process Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis.

UNIT IV:

Pricing strategies

Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis.

UNIT V:

Budgetary Control

Flexible Budgets, Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing. Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

TEXT BOOKS:

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting

M.TECH – I YEAR – II SEM
(R18DCS52) INFORMATION SECURITY (OPEN ELECTIVE II)

Objective:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

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Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

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3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
4. Information Systems Security by Nina Godbole, WILEY 2008.

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1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

M.TECH – I YEAR – II SEM

(R18DAE52) UNMANNED AERIAL VEHICLES (OPEN ELECTIVE II)

UNIT-I:

INTRODUCTION TO UNMANNED AIRCRAFT SYSTEMS

Applications of UAS, categories of UAV systems, roles of unmanned aircraft, composition of UAV system.

UNIT-II:

DESIGN OF UAV SYSTEMS-I

Introduction to design and selection of the systems-conceptual phase, preliminary design, detailed design; Aerodynamics and airframe configurations-Lift-induced Drag, Parasitic Drag, Rotary-wing Aerodynamics, Response to Air Turbulence, Airframe Configurations; Medium-range, Tactical Aircraft, Characteristics of Aircraft Types-Long-endurance, Long-range Role Aircraft, Medium-range, Tactical Aircraft, Close-range/Battlefield Aircraft, MUAV Types, MAV and NAV Types, UCAV, Novel Hybrid Aircraft Configurations, Aspects of Airframe Design: Scale Effects, Packaging Density, Aerodynamics, Structures and Mechanisms, Selection of power- plants, Modular Construction, Ancillary Equipment, Design for Stealth: Acoustic Signature, Visual Signature, Thermal Signature, Radio/Radar Signature, Payload Types: Non-dispensable and dispensable payloads.

UNIT-III:

DESIGN OF UAV SYSTEMS-II

Communications-Communication Media, Radio Communication, Mid-air Collision (MAC) Avoidance, Communications Data Rate and Bandwidth Usage, Antenna Type; Control and Stability: HTOL Aircraft, Convertible Rotor Aircraft, Payload Control, Sensors, Autonomy; Navigation: NAVSTAR Global Positioning System (GPS), TACAN, LORAN C, Inertial Navigation, Radio Tracking, Way-point Navigation; Launch and Recovery.

Design for Reliability: Determination of the Required Level of Reliability, Achieving Reliability, Reliability Data Presentation, Multiplexed Systems, Reliability by Design, Design for Ease of Maintenance; Design for Manufacture and Development

UNIT-IV:

THE DEVELOPMENT OF UAV SYSTEMS

System Development and Certification-System Development, Certification, Establishing Reliability; System Ground Testing: UAV Component Testing, UAV Sub- assembly and Sub-system Testing, Testing Complete UAV, Control Station Testing , Catapult Launch System Tests, Documentation; System In- flight Testing: Test Sites, Preparation for In-flight Testing, In- flight Testing, System certification.

UNIT-V:

DEPLOYMENT AND FUTURE OF UAV SYSTEMS

Operational trials and full certification; UAV System Deployment- Network-centric Operations (NCO), Teaming with Manned and Other Unmanned System; Naval, arm and air force roles, civilian, paramilitary and commercial roles.

Text Books:

1. Reg Austin, Wiley, “Unmanned Aircraft Systems, UAVS Design and Deployment”, 2nd Edition, 2010.

Reference Books:

1. Richard K. Barnhart, Stephen B. Hottman, Douglas M. Marshall, Eric Shappee, (eds.), “Introduction to Unmanned Aircraft Systems”, CRC Press, 2012.
2. Valavanis, Kimon P., Vachtsevanos, George J. “Handbook of Unmanned Aerial Vehicles” AIAA series, 3rd Edition, 2004.

M.TECH – I YEAR – II SEM
(R18DEC52) RESEARCH METHODOLOGY (OPEN ELECTIVE II)

UNIT - I

Introduction: Research objective and motivation, Types of research, Research approaches, Significance, Research method vs. methodology, Research process.

UNIT - II

Formulating a research problem: Literature review, Formulation of objectives, Establishing Operational definitions, Identifying variables, constructing hypotheses.

UNIT - III

Research design and Data Collection: Need and Characteristics, Types of research design, Principles of Experimental research design, Method of data collection, Ethical issues in collecting data.

UNIT - IV

Sampling and Analysis of data: Need of Sampling, Sampling distributions, Central limit theorem, Estimation: mean and variance, Selection of sample size Statistics in research, Measures of Central tendency, Dispersion, asymmetry and relationships, Correlation and Regression analysis, Displaying data

UNIT - V

Hypothesis Testing: Procedure, Hypothesis testing for difference in mean, variance limitations, Chi-square test, Analysis of variance (ANOVA), Basic principles and techniques of writing a Research Proposal

Text Books:

1. R. C. Kothari, Research Methodology: Methods and Techniques, 2nd edition, New Age International Publisher, 2009

2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition, SAGE, 2005

References:

1. Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/>

2. (Electronic Version): StatSoft, Inc. (2012). Electronic Statistics Textbook. Tulsa, OK: StatSoft. WEB: http://www.statsoft.com/textbook/.(Printed Version): Hill, T. & Lewicki, P. (2007). STATISTICS: Methods and Applications. StatSoft, Tulsa, OK.

(R18D5882) INTERNET TECHNOLOGIES AND SERVICES LAB

Objectives:

- Write syntactically correct HTTP messages and describe the semantics of common HTTP methods and header fields
- Discuss differences between URIs, URNs, and URLs, and demonstrate a detailed understanding of http-scheme URLs, both relative and absolute
- Describe the actions, including those related to the cache, performed by a browser in the process of visiting a Web address
- Install a web server and perform basic administrative procedures, such as tuning communication parameters, denying access to certain domains, and interpreting an access log
- Write a valid standards-conformant HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms
- Use CSS to implement a variety of presentation effects in HTML and XML documents, including explicit positioning of elements
- Demonstrate techniques for improving the accessibility of an HTML document

List of Sample Problems:

i) Internet Technologies

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com the website should consist the following pages. Home page, Registration and user Login User Profile Page, Books catalog Shopping Cart, Payment By credit card Order Conformation
2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
4. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using Servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
5. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.
6. Implement the “Hello World!” program using JSP Struts Framework.

ii) Additional Assignment Problems

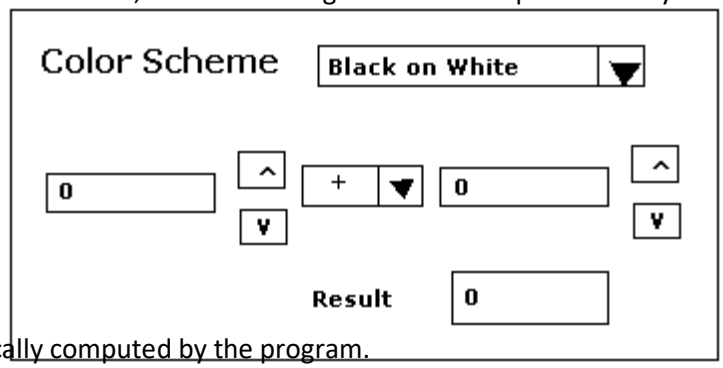
Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.

Write a java swing application that takes a text file name as input and counts the characters, words and lines in the file. Words are separated with white space characters and lines are separated with new line character.

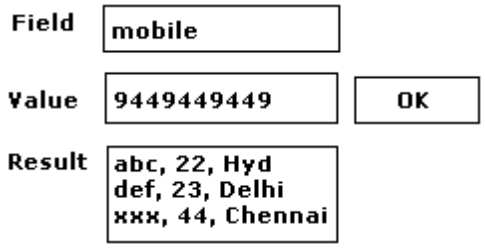
Write a simple calculator servlet that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands. It should check in a database if the same expression is already computed and if so, just return the value from database. Use MySQL or PostgreSQL.

Write an HTML page that contains a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital

(color, bold and font size).
Write a servlet that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit this site” message, where <name> should be replaced with the entered name. Otherwise it should send “Welcome <name> to this site” message.
Write a calculator program in HTML that performs basic arithmetic operations (+, -, /, * and %). Use CSS to change the foreground and background color of the values, buttons and result display area separately. Validate the input strings using JavaScript regular expressions. Handle any special cases like division with zero reasonably. The screen may look similar to the following:
Internet Technologies and Services
Write a Java program that creates a calculator GUI, as shown in figure. Extra components may be added for convenience:



The Color Scheme may be Black on White or Blue on Yellow (selectable) and accordingly all components colors must be changed. The values can be either entered or increased or decreased by a step of 10. The operators are +, -, / and * (selectable). Once any change takes place, the result must be automatically computed by the program.
Write a Java Application that will read an XML file that contains personal information (Name, Mobile Number, age and place. It reads the information using SAX parser. After reading the information, it shows two input Text Fields in a window, one for tag name and the other for value. Once these two values are given, it should list all the records in the XML file that match the value of the given field in a text area (result box). For example, if the two text boxes are entered with “name” and “ABCD” then it should show all the records for which name is “ABCD”? An Illustration is given below that takes a mobile number and lists all the records that have the same mobile number.



Consider the following web application for implementation:
The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.
If name and password matches, serves a welcome page with user's full name.
If name matches and password doesn't match, then serves “password mismatch” page
If name is not found in the database, serves a registration page, where users full name, present user name (used to login) and password are collected. Implement this application in:
1. Pure JSP
2. Pure Servlets
3. Struts Framework
Implement a simple arithmetic calculator with +, -, /, *, % and = operations using Struts Framework The number of times the calculator is used should be displayed at the bottom (use session variable).
iii) Internet Technologies and Services Lab - Additional Problems
Create a web Service in Java that takes two city names from the user and returns the distance

between these two from data available from a table in MySql.
Write a java and a C# client which use the above service
Write a Java program that takes a file as input and encrypts it using DES encryption. The program should check if the file exists and its size is not zero.
Write a Java program that generates a key pair and encrypts a given file using RSA algorithm.
Write a Java program that finds digest value of a given string.
Consider the following xml file for encryption
<?xml version="1.0"> <transaction> <from>12345</from> <to>54321</to> <amount>10000</amount>
<secretcode>abc123</secretcode> <checksum></checksum> </transaction>
Replace <from> and <to> values with the RSA encrypted values represented with base64 encoding assuming that the public key is available in a file in local directory "pubkey.dat". Encrypt <secretcode> with AES algorithm with a password 'secret'. The checksum of all the field values concatenated with a delimiter character '+' will be inserted in the checksum and the xml file is written to encrypted.xml file.
Assume that a file 'config.xml', which has the following information:
<users>
<user> <name>abc</name> <pwd>pwd123</pwd> <role>admin</role> <md5>xxx</md5> </user>
<user> <name>def</name> <pwd>pwd123</pwd> <role>guest</role> <md5>xxx</md5> </user>
</users>
Replace name and role with DES encrypted values and pwd with RSA encrypted values (represent the values with base64 encoding). The public key is available in "public.key" file in current directory. Replace xxx with respective MD5 values of all the fields for each user. Write the resulting file back to config.xml.
Write an HTML page that gives 3 multiple choice (a,b,c and d) questions from a set of 5 preloaded questions randomly. After each question is answered change the color of the question to either green or blue using CSS. Finally on clicking OK button that is provided, the score should be displayed as a pop-up window. Use Java Script for dynamic content.
Write an HTML page that has 3 countries on the left side ("USA", "UK" and "INDIA") and on the right side of each country, there is a pull-down menu that contains the following entries: ("Select Answer", "New Delhi", "Washington" and "London"). The user will match the Countries with their respective capitals by selecting an item from the menu. The user chooses all the three answers (whether right or wrong). Then colors of the countries should be changed either to green or to red depending on the answer. Use CSS for changing color.
Write an HTML Page that can be used for registering the candidates for an entrance test. The fields are: name, age, qualifying examination (diploma or 10+2), stream in qualifying examination. If qualifying examination is "diploma", the stream can be "Electrical", "Mechanical" or "Civil". If the qualifying examination is 10+2, the stream can be "MPC" or "BPC". Validate the name to accept only characters and spaces.
Write an HTML page that has two selection menus. The first menu contains the states ("AP", "TN" and "KN") and depending on the selection the second menu should show the following items: "Hyderabad", "Vijayawada", "Kurnool" for AP, "Chennai", "Salem", "Madurai" for TN and "Bangalore", "Bellary", "Mysore" for KN.
Write an HTML page that has phone buttons 0 to 9 and a text box that shows the dialed number. If 00 is pressed at the beginning, it should be replaced with a + symbol in the text box. If the number is not a valid international number (+ followed by country code and 10 digit phone number) the color of the display should be red and it should turn to green when the number is valid. Consider only "+91, +1 and +44 as valid country codes. Use CSS for defining colors.
Write an HTML page that has a text box for phone number or Name. If a number is entered in the box the name should be displayed next to the number. If 00 is pressed at the beginning, it should be

replaced with a + symbol in the text box. If a name is entered in the text box, it should show the number next to the name. If the corresponding value is not found, show it in red and show it in green otherwise. Use CSS for colors. Store at least 5 names and numbers in the script for testing.

A library consists of 10 titles and each title has a given number of books initially. A student can take or return a book by entering his/her HTNo as user ID and a given password. If there are at least two books, the book is issued and the balance is modified accordingly.

(a) Use RDBMS and implement it with JSP.
(b) Use XML File for data and Implement it with JSP
(c) Use RDBMS and implement it with Servlets
(d) Use XML File for data and Implement it with Servlets

A Bus Reservation System contains the details of a bus seat plan for 40 seats in 2x2 per row arrangement, where the seats are numbered from 1 to 40 from first row to last row. The customer can visit the website and can reserve a ticket of his choice if available by entering his details (Name, Address, Gender and Age). The customer can cancel the ticket by entering the seat number and his name as entered for reservation.

(a) Use RDBMS and implement it with JSP.
(b) Use XML File for data and Implement it with JSP
(c) Use RDBMS and implement it with Servlets
(d) Use XML File for data and Implement it with Servlets.

Implement a simple messaging system with the following details:

When a student logs in with his/her HTNO and a given password, they should get all the messages posted to him/her giving the ID of sender and the actual message. Each message may be separated with a ruler. There should be a provision for the user to send a message to any number of users by giving the IDs separated with commas in the “To” text box.

(a) Use RDBMS and implement it with JSP.
(b) Use XML File for data and Implement it with JSP
(c) Use RDBMS and implement it with Servlets
(d) Use XML File for data and Implement it with Servlets.

There is an image of 600x100 size which can be logically divided into 12 button areas with labels (0-9, +, =).

Write a javascript calculator program that uses this image as input virtual keyboard and three text areas for two input numbers and result of sum of these numbers. Add a CSS that can be used to change the colors of text and background of text areas and the page. The input numbers can be up to 4 digits each.

Develop a web application that takes user name and password as input and compares them with those available in an xml user database. If they match, it should display the welcome page that contains the user’s full name and last used date and time retrieved from a client cookie. On logout it stores new time to the cookie and displays a goodbye page. If authentication fails, it should store the attempt number to the client cookie and displays an error page. Add necessary CSS that takes care of the font, color of foreground and background.

A web application has the following specifications:

The first page (Login page) should have a login screen where the user gives the login name and password. Both fields must be validated on client side for a minimum length of 4 characters, name should be lower case az characters only and password should contain at least one digit. On submitting these values, the server should validate them with a MySQL database and if failed, show the login page along with a message saying “Login Name or Password Mismatch” in Red color below the main heading and above the form. If successful, show a welcome page with the user's full name (taken from database) and and a link to Logout. On logout, a good bye page is displayed with the total time of usage (Logout time – login time). Specify the Schema details of table and web.xml file contents.

Implement it using (a) JSP Pages (b) Servlets (c) Struts
Design a struts based web portal for an international conference with following specifications:
The welcome page should give the details of the conference and a link to login. If login fails, direct them back for re-login and also provide a link for registration. On successful registration/login, the user will be directed to a page where s/he can see the status (accepted/rejected) of their already submitted papers followed by a form for submitting a doc file to the conference. Provide a logout button on all pages including the home page, once the user logs in. Implement validation framework to check that the user name is in the form of CCDDCC and password is in the form of (CCSDDD) (C for character, S for special character (one of @, #, $, %, ^, & and !) and D for digit)., Database should be accessed through Connection Pool for MySql for user information. Provide scope for internationalization in future. Assume any missing information and mention it first.

(R18DHS55)ENGLISH FOR RESEARCH PAPER WRITING
(AUDIT COURSE II)

UNIT I:

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and vagueness

UNIT II:

Clarifying Who Did What, Highlighting Your Findings, Hedging, and Critics in paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction

UNIT III:

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT IV:

key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

UNIT V:

skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions: useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

TEXT BOOKS:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

OUTCOMES:

Students will be able to:

1. Write in a clear, coherent, and direct style appropriate for academic research
2. Draft coherent and unified paragraphs with adequate supporting details.
3. Develop the strategy to use lexical terms effectively.
4. Adopt appropriate syntactic and semantic techniques
5. Demonstrate analytical and inferencing skills.

MASTER OF TECHNOLOGY
In
THERMAL ENGINEERING

Course Structure and Syllabus
Department of Mechanical Engineering



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTUH, Hyderabad, Approved by AICTE - Accredited by NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally, Kompally, Secunderabad – 500100, Telangana State, India.

Contact Number: 7207034237, 9133555162, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

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MASTER OF TECHNOLOGY
THERMAL ENGINEERING

DEPARTMENT OF
MECHANICAL ENGINEERING

Course Structure and Syllabus

(Batches admitted from the academic year 2018 - 2020)

Note: The regulations hereunder are subjected to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

*"Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

*"Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

*"Commission" means University Grants Commission.

*"AICTE" means All India Council for Technical Education.

*"University" means Jawaharlal Nehru Technological University, Hyderabad.

*"College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

*"Program" means:

Master of Technology (M.Tech) degree program

PG Degree Program: M.Tech

*"Branch" means specialization in a program like M.Tech degree program in Mechanical Engineering, M.Tech degree program in Aeronautical Engineering etc.

*"Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

*T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET)is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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VISION

- To become a model institution in the fields of Engineering Technology and Management.
- To have a perfect synchronization of the ideologies of MRCET with challenging demands of International Pioneering Organizations

MISSION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become pioneers of Indian vision of modern society

For more information: www.mrcet.ac.in

ACADEMIC REGULATIONS R-18 FOR M.TECH (REGULAR) DEGREE COURSE

Academic Regulations of R-18 are applicable for the students of M.Tech (Regular) Course from the Academic Year 2018-20 and onwards. The M.Tech Degree of Malla Reddy College of Engineering & Technology (MRCET), Secunderabad shall be conferred on candidates who are admitted to the program and who fulfill all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS

1.1 Admission to the above program shall be made subject to eligibility, qualification and specialization as prescribed by the University from time to time.

1.2 Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University (or) State Government (or) on the basis of any other order of merit as approved by the University, subject to norms as laid down by the State Govt. from time to time.

2.0 AWARD OF M.TECH DEGREE

2.1 A student shall be declared eligible for the award of the M.Tech Degree, if he pursues a course of study in not less than two and not more than four academic years.

2.2 A student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the year of his admission, shall forfeit his seat in M.Tech. course.

2.3 The student shall register for all 88 credits and secure all the 88 credits.

2.4 The minimum instruction days in each semester are 90.

3.0 A. COURSE OF STUDY

3.1 The following specializations are offered at present for the M.Tech. course of study.

3.2 Aerospace Engineering

3.3 Computer Science and Engineering

3.4 Machine Design

3.5 System and Signal Processing

3.6 VLSI and Embedded Systems

3.7 Thermal Engineering

and any other course as approved by the MRCET from time to time.

3.0B. Departments offering M.Tech. Programmes with specializations are noted below:

Aeronautical Engineering	Aerospace Engineering
Computer Science Engineering	Computer Science Engineering
Electronics & Communication Engineering	System & Signal Processing
Electronics & Communication Engineering	VLSI and Embedded Systems
Mechanical Engineering	Machine Design
Mechanical Engineering	Thermal Engineering

4.0 ATTENDANCE

The programs are offered on a unit basis with each subject being considered a unit.

4.1 A student shall be eligible to write University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

4.2 Condonation of shortage of attendance in aggregate up to 10% (65%andaboveandbelow75%) in each semester shall be granted by the College Academic Committee.

4.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

4.4 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration shall stand cancelled.

4.5 A prescribed fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

4.6 A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfill sthe attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

4.7 In order to qualify for the award of the M.Tech. Degree, the candidate shall complete all the academic requirements of the subjects, as per the course structure.

4.8 A student shall not be promoted to the next semester unless he satisfies the minimum academic requirements of the previous semester.

5.0 EVALUATION

The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks for theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

For the theory subjects 70 marks shall be awarded based on the performance in the End Semester Examination and 30 marks shall be awarded based on the Internal Examination Evaluation. The internal evaluation consists of two mid-term examinations each covering descriptive paper 24 marks

which consists of six questions and answers any four questions, each carrying 6 marks a total duration of 2 hours. Average of the two mid-term examinations shall be taken as the final marks secured by each candidate. Six (6) marks are allocated for Assignments (as specified by the subject teacher concerned).The total marks secured by the student in mid-term examination and assignment is evaluated for 30 marks.

However, any student scoring internal marks less than 40% will be given a chance to write the internal exam once again after he/she re-registering for the concerned subject and paying stipulated fees as per the norms.

5.1 The end semesters examination will be conducted for 70marks with 5 questions consisting of two questions each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carries 14 marks.

5.2 For practical subjects, 70 marks shall be awarded based on the performance in the End Semester Examinations and 30 marks shall be awarded based on the day-to-day performance as Marks.

5.3 There shall be two seminar presentations during I year I semester and II semester respectively. For seminar, a student under Internal the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Departmental Academic Committee consisting of Head of the Department, Supervisor and two other senior faculty members of the department. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.

5.4 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End semester Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Examination taken together.

5.5 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.4) he has to reappear for the End semester Examination in that subject.

5.6 A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and so has failed in the end examination. In such a case, the candidate must re-register for the subject (s) and secure the required minimum attendance. The candidate's attendance in there- writing the end examination in those subject(s). In the registered subject (s) shall be calculated separately to decide upon his eligibility for even to the student taking another chance, his internal marks and end examination marks obtained in the previous attempt stand cancelled. In case the candidate secures less than the required attendance in any subject he shall not be permitted to write the End Examination in that subject. He shall re-register the subject when next offered.

5.7 Laboratory examination for M.Tech courses must be conducted with two Examiners, one of them being the Laboratory Class Teacher and the second examiner shall be another Laboratory Teacher.

6.0 EVALUATIONOFPROJECT/DISSERTATIONWORK

6.1 Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

6.2 A Project Review Committee (PRC) shall be constituted with Principal as Chairperson, Heads of all the Departments offering the M.Tech. programs and two other senior faculty members.

6.3 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.

6.4 After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the Departmental Academic Committee for approval. Only after obtaining the approval of the Departmental Academic Committee can the student initiate the Projectwork.

6.5 If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the Departmental Academic Committee. However, the Departmental Academic Committee shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

6.6 A candidate shall submit his status report in a bound-form in two stages at least with a gap of 3 months betweenthem.

6.7 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of theory and practical course with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Principal through Head of the Department and make an oral presentation before thePRC.

6.8 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/School/Institute.

6.9 The thesis shall be adjudicated by one examiner selected by the University. For this, the Principal of the College shall submit a panel of 5 examiners, eminent in that field, with the help of the guide concerned and head of the department.

6.10 If the report of thesis not favorable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected.

6.11 If there port of the examiner is favorable, Viva-Voce examination shall be conducted by aboard consisting of the Supervisor, Head of the Department and the examiner who adjudicated the Thesis. The Board shall jointly report the candidate's work as one of the following:

A Excellent
B Good
C Satisfactory
D Unsatisfactory

The Head of the Department shall coordinate and make arrangements for the conduct of Viva-Voce examination.

If the report of the Viva-Voce is unsatisfactory, the candidate shall retake the Viva-Voce examination only after three months. If he fails to get a satisfactory report at the second Viva-Voce examination, he will not be eligible for the award of the degree.

7.0 AWARD OF DEGREE AND CLASS

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the Credit Based Semester System (CBCS).
Letter Grades and Grade Points:
The UGC recommends a 10-point grading system with the following letter grades as given below:

Grades	Points	Marks secured (%)
O (Outstanding)	10	≥ 85
A+(Excellent)	9	80 – 84
A(Very Good)	8	75 – 79
B+(Good)	7	70 – 74
B(Above Average)	6	65 – 69
C(Average)	5	60 – 64
P(Pass)	4	50 – 59
F(Fail)	0	<50
Ab(Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination

Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

SGPA (S_i) = $\Sigma(C_i \times G_i) / \Sigma C_i$

Where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

CGPA = $\Sigma(C_i \times S_i) / \Sigma C_i$

Where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

8.0 WITHHOLDINGOFRESULTS

If the student has not paid the dues, if any, to the Institute or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed in to the next semester. His degree will be with held in such cases.

9.0 TRANSITORYREGULATIONS

Discontinued, detained, or failed candidates are eligible for admission to two earlier or equivalent subjects at a time as and when offered.

10. GENERAL

10.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

10.2 The academic regulation should be read as a whole for the purpose of any interpretation.

10.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council of the College is final.

10.4 The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Academic Council of the College/Affiliating University.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper conduct If the candidate:	Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the

		examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Using objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other

	instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance i n that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining

		examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Academic Council of the College (or) affiliating University for further action towards suitable punishment.	

Malpractices identified by squad or special invigilators will entail punishment to the candidates as per the above guidelines..

M. Tech – (THERMAL ENGINEERING)

COURSE STRUCTURE

I Year I Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D2101	Advanced Thermodynamics	3	-	3	30	70
2	R18D2102	Advanced Heat and Mass Transfer	3	-	3	30	70
3	R18D2103	Advanced Fluid Mechanics	3	-	3	30	70
4	R18D2104 R18D2105 R18D2106	**PROGRAM ELECTIVE-I** Cryogenic Engineering Solar Energy Technology Turbo Machines	3	-	3	30	70
5	R18D2107 R18D2108 R18D2109	**PROGRAM ELECTIVE-II** Advanced I.C. Engines Design of Heat Exchangers Energy and Environmental Engineering	3	-	3	30	70
6		**OPEN ELECTIVE –I**	3	-	3	30	70
7	R18D2181	Thermal Engineering Laboratory	-	3	2	30	70
8	R18DHS55	**Audit Course I** Disaster Management	2	-	-	50	-
Total			**20**	**3**	**20**	**260**	**490**

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE I			
Subject Code	**Subject Name**	**Subject Code**	**Subject Name**
R18DME51	Non-Conventional Energy Sources	R18DCS51	Scripting Languages
R18DME52	Industrial Safety	R18DAE51	Mathematical Modeling Techniques
R18DME53	Operations Research	R18DEC51	Embedded Systems Programming
R18DHS51	Business Analytics		

I Year II Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D2110	Fuels, Combustion and Environment	3	-	3	30	70
2	R18D2111	Computational Fluid Dynamics	3	-	3	30	70
3	R18D2112	Advanced Finite Element Analysis	3	-	3	30	70
4		**PROGRAMELECTIVE – III**	3	-	3	30	70
	R18D2113	Energy Management					
	R18D2114	Industrial Refrigeration Systems					
	R18D2115	Jet Propulsion and Rocket Engines					
5		**PROGRAMELECTIVE- IV**	3	-	3	30	70
	R18D2116	Thermal and Nuclear Power Plants					
	R18D2117	Thermal Measurements and Process Controls					
	R18D2118	Refrigeration and Air-Conditioning					
6		**OPEN ELECTIVE- II**	3	-	3	30	70
7	R18D2182	Computational Methods Laboratory	-	3	2	30	70
8		**Audit Course II**	2	-	-	50	
	R18DHS56	English for Research Paper Writing					
Total			**20**	**3**	**20**	**260**	**490**

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II			
Subject Code	Subject Name	Subject Code	Subject Name
R18DME54	Composite Materials	R18DCS52	Information Security
R18DME55	Waste to Energy	R18DAE52	Unmanned Air Vehicles
R18DME56	Industrial Management	R18DEC52	Research Methodology
R18DHS52	Cost Management of Engineering Projects		

IIYear I Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D2183	Seminar-I	-	-	2	50	-
2	R18D2191	Mini Project	-	-	4	100	-
3	R18D2192	Project Review I	-	-	8	100	-
Total			**-**	**-**	**14**	**250**	**-**

II Year II Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D2184	Seminar-II	-	-	2	50	-
2	R18D2193	Project Review - II	-	-	8	100	-
3	R18D2194	Project Viva-Voce	-	-	8	-	100
Total			**-**	**-**	**18**	**150**	**100**

SEMESTER-I
SYLLABUS

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

L	T/P/D	C
3	-	3

(R18D2101) ADVANCED THERMODYNAMICS

Course Objectives:

- This course aims to provide a good platform to mechanical engineering students to understand, model and appreciate concept of dynamics involved in thermal energy transformation.
- To understand the nature and operating principles of systems involving energy flows.
- To describe and apply basic thermodynamic principles to analyze and predict performance of idealized forms of thermodynamic systems.
- To describe and assess benefits of improvements to thermodynamic systems.
- To relate idealized thermodynamic system models to corresponding real systems.

UNIT-I

Review of Thermodynamic Laws and Corollaries: Transient flow analysis, Second law thermodynamics, Entropy, Availability and unavailability, Thermodynamic potential. Maxwell relations, Specific heat relations, Mayer's relation. Evaluation of thermodynamic properties of working substance.

UNIT-II

P.V.T Surface: Equation of state. Real gas behavior, Vander Waal's equation, Generalization compressibility factor. Energy properties of real gases. Vapour pressure, Clausius, Clapeyro equation. Throttling, Joule. Thompson coefficient. Non reactive mixtures of perfect gases. Governing laws, Evaluation of properties, Psychometric mixture properties and psychometric chart, Air conditioning processes, cooling towers. Real gas mixture.

UNIT-III

Combustion: Combustion Reactions, Enthalpy of formation. Entropy of formation, Reference levels of tables. Energy of formation, Heat reaction, Adiabatic flame temperature generated product, Enthalpies, Equilibrium. Chemical equilibrium of ideal gased, Effect of non reacting gases equilibrium in multiple reactions, the vent hoff's equation. The chemical potential and phase equilibrium. The Gibbs phase rule.

UNIT-IV

Power Cycles: Review binary vapour cycle, co generation and combined cycles, Second law analysts of cycles. Refrigeration cycles. Thermodynamics off irreversible processes. Introduction, Phenomenological laws, Onsaga Reciprocity relation, Applicability of the Phenomenological relations, Heat flux and entropy production, Thermodynamic phenomena, Thermo electric circuits.

UNIT-V

Direct Energy Conversion Introduction: Fuel cells, Thermo electric energy, Thermo ionic power generation, Thermodynamic devices magneto hydrodynamic generations, Photovoltaic cells.

Course Outcomes:

- Provide in-depth knowledge on fundamental and applied thermodynamics and clear understanding of basic principles of work and energy conversion.
- To appreciate concepts learnt in fundamentals laws of thermodynamics from which learning ideas how to sustain in energy crisis.
- Understand the combustion phenomenon and its reaction using mathematical models.
- To identify and formulate power production based on the fundamentals laws of thermal engineering
- To apply the knowledge of mathematics, science and engineering fundamentals to model the energy conversion phenomenon.

TEXT BOOKS:

1. P.K. Nag, “Engineering Thermodynamics”, 4 th Edition, Tata McGraw-Hill Education Private Limited, 2010.
2. S.S. Thipse, “Advanced Thermodynamics”, Narosa Publishing House, New Delhi, 2013
3. Thermal Engineering by R.K.Rajput, Lakshmi Publications.

REFERENCE BOOKS:

1. Y.A. Cengel and M.A. Boles, “Thermodynamics – An Engineering Approach”, 5 th Edition in SI Units, Tata McGraw Hill Publishing Company Limited, New Delhi, 2006.
2. C. Borganakke and R.E. Sonntag, “Fundamentals of Thermodynamics”, 7 th Edition, Wiley India, Delhi, 2012.
3. Van P. Carey, “Statistical thermodynamics and micro scale thermo physics”, Cambridge University Press, 1999

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

L	T/P/D	C
3	-	3

(R18D2102) ADVANCED HEAT AND MASS TRANSFER

Course Objectives:

- To develop the ability to use the heat transfer modes.
- To analyze the thermal analysis and sizing of heat exchangers and to learn the heat transfer coefficient for compact heat exchange**s.**
- To understand the various types of flows and applying in empirical equations
- To understand and analyze boiling and condensation through geometrics
- Toachieveanunderstandingofthebasicconceptsofphasechangeprocesses

UNIT-I

Brief introduction to different modes of heat transfer: Conduction: General heat Conduction equation-initial and boundary conditions.

Transient heat conduction: Lumped system analysis-Heisler charts-semi infinite solid-use ofshape factors in conduction-2D transient heat conduction-product solutions.

UNIT-II

Finite difference methods for conduction: 1D & 2D steady state and simple transient heat conduction problems-implicit and explicit methods.

Forced Convection: Equations of fluid flow-concepts of continuity, momentum equations-derivation of energy equation-methods to determine heat transfer coefficient: Analytical methods-dimensional analysis and concept of exact solution. Approximate method-integral analysis.

UNIT-III

External flows: Flow over a flat plate: integral method for laminar heat transfer coefficient for different velocity and temperature profiles. Application of empirical relations to variation geometries for laminar and turbulent flows.

Internal flows: Fully developed flow: integral analysis for laminar heat transfer coefficient-types of flow-constant wall temperature and constant heat flux boundary conditions-hydrodynamic *&* thermal entry lengths; use of empirical correlations.

UNIT-IV

Free convection: Approximate analysis on laminar free convective heat transfer-bousisinesq approximation-different geometries-combined free and forced convection.

Boiling and condensation: Boiling curve-correlations-Nusselt's theory of film condensation on a vertical plate-assumptions & correlations of film condensation for different geometries.

UNIT-V

Radiation heat transfer: Radiant heat exchange in grey, non-grey bodies, with transmitting.

Reflecting and absorbing media, spherical surfaces, and gas radiation-radiation from flames.
Mass Transfer: Concepts of mass transfer-diffusion & convective mass transfer analogies-significance of non-dimensional numbers.

Course Outcomes:

- On successful completion of this course the student will be able to apply various correlations for heat transfer calculations.
- To present fundamentals of momentum, heat and mass transfer and to introduce general conservation equation for transport phenomena.
- To analyze empirical relations to variation geometries for laminar and turbulent flows.
- To understand radiation heat transfer in grey body and non-grey bodies.
- To understand analogy between momentum, heat and mass transfer.

TEXTBOOKS:

1. Principles of Heat Transfer/Frank Kreith/Cengage Learning
2. Elements of Heat Transfer/E. Radha Krishna/CRC Press/2012
3. Heat Transfer/RK Rajput/S.Chand

REFERENCE BOOKS:

1. Introduction to Heat Transfer/SK Som/PHI
2. Engineering Heat & Mass Transfer/Mahesh Rathore/Lakshmi Publications
3. Heat Transfer / Necati Ozisik / TMH

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

L	T/P/D	C
3	-	3

(R18D2103) ADVANCED FLUID MECHANICS

Course Objectives:

- To understand the laws of fluid flow for ideal and viscous fluids.
- To represent the real solid shapes by suitable flow patterns and to analyze the same for aerodynamics performances.
- To understand the changes in properties incompressible flow and shock expansion.
- Too make the student understand the concepts of boundaries.
- To make the student capable to establish a relation between fluid flow and concepts of thermodynamics.

UNIT-I

In Viscid Flow of Incompressible Fluids: Lagrangian and Eulerain Descriptions of fluid motion- Path lines, Stream lines, Streak lines, stream tubes velocity of a fluid particle, types of flows, Equations of three dimensional continuity equation- Stream and Velocity potential functions.

Basic Laws of Fluid Flow: Condition for irrotationality, circulation & vorticity Accelerations in Cartesystems normal and tangential accelerations, Euler's, Bernouli equations in 3D– Continuity and Momentum Equations

UNIT-II

Viscous Flow: Derivation of Navier-Stoke's Equations for viscous compressible flow – Exact solutions to certain simple cases: Plain Poisoulle flow - Coutte flow with and without pressure gradient - Hagen Poisoulle flow - Blasius solution.

UNIT-III

Boundary Layer Concepts: Prandtl's contribution to real fluid flows – Prandtl's boundary layertheory - Boundary layer thickness for flow over a flat plate – Approximate solutions – Creeping motion (Stokes) – Oseen's approximation - Von-Karman momentum integral equation for laminar boundary layer –– Expressions for local and mean drag coefficients for different velocity profiles.

UNIT-IV

Introduction to Turbulent Flow: Fundamental concept of turbulence – Time Averaged Equations – Boundary Layer Equations - Prandtl Mixing Length Model - Universal Velocity

Distribution Law: Van Driest Model –Approximate solutions for drag coefficients – More Refined Turbulence Models – k-epsilon model - boundary layer separation and form drag – Karman Vortex Trail, Boundary layer control, lift on circular cylinders

Internal Flow: Smooth and rough boundaries – Equations for Velocity Distribution and frictional Resistance in smooth rough Pipes – Roughness of Commercial Pipes – Moody's diagram.

UNIT –V

Compressible Fluid Flow – I: Thermodynamic basics–Equations of continuity, Momentum and Energy - Acoustic Velocity Derivation of Equation for Mach Number–Flow Regimes–Mach Angle–Mach Cone–Stagnation State

Compressible Fluid Flow – II: Area Variation, Property Relationships in terms of Mach number, Nozzles, Diffusers – Fanno and Rayleigh Lines, Property Relations – Isothermal Flow in Long Ducts – Normal Compressible Shock, Oblique Shock: Expansion and Compressible Shocks – Supersonic Wave Drag.

Course Outcomes:

- To apply knowledge of mathematics, science and engineering in compressible and incompressible fluid flows.
- To understand and analyse the concept of viscous fluids
- To derive the governing equations of fluid flow and applying them to simple flow problems.
- To understand turbulent flow and develop models using Moody's diagram
- Emphasizing the mathematical formulation of various flow problems

TEXT BOOKS

1. Fluid Mechanics and Machines/Modi and Seth/Standard Book House
2. Fluid Mechanics/Cohen and Kundu/Elsevier/5th edition
3. Fluid Mechanics/Potter/Cengage Learning

REFERENCE BOOK:

1. Fluid Mechanics and Machines/CP Kodandaraman/New Age Publications
2. A Text book of Fluid Mechanics/RK Rajput/S. Chand
3. Boundary Layer Theory/ Schlichting H /Springer Publications

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

L	T/P/D	C
3	-	3

(R18D2104) CRYOGENIC ENGINEERING
(PROGRAM ELECTIVE-I)

Course Objectives:

- To provide an introductory knowledge of Cryogenic Engineering.
- To provide the fundamentals of cryogenics
- To understand the behavior of materials at low temperatures.
- To accustom with various methods of production of cryogenic fluids
- To develop skills for designing cryogenic systems including refrigeration, storage & transfer of cryogens, and instrumentation.

UNIT-I

Introduction to Cryogenic Systems: Mechanical Properties at low temperatures. Properties of Cryogenic Fluids.

Gas Liquefaction: Minimum work for liquefaction. Methods to protect low temperature, Liquefaction systems for gases other than, Neon, Hydrogen and Helium.

UNIT-II

Liquefaction Systems for Neon, Hydrogen and Helium: Components of Liquefaction systems. Heat exchangers. Compressors and Expanders, Expansion valve, Losses in real machines.

UNIT-III

Gas Separation and Purification Systems: Properties of mixtures, Principles of mixtures, Principles of gas separation, Air separation systems.

UNIT-IV

Cryogenic Refrigeration Systems: Working Medium, Solids, Liquids, Gases, Cryogenicfluid storage & transfer, Cryogenic storage systems, Insulation, Fluid transfer mechanisms, Cryostat, CryoCoolers

UNIT-V

Applications: Space technology, In-Flight air separation and collection of LOX, Gas industry,Biology, Medicine, Electronics.

Course Outcomes:

- Understand the structures of different cryogenic systems and the analytical method for cryogenic thermodynamic cycle, and cryogenic gases and liquids and their mixtures.
- Understand the principles cryogenics systems for Liquefaction Systems of nitrogen, neon and helium

- Remember the gas separation and purification systems
- Understand the cryogenic refrigeration systems for solid, liquid and gaseous fuels
- Evaluate material properties at cryogenic temperature and understand the applications

TEXTBOOKS:

1. Cryogenic Systems/ R.F.Barren/ Oxford University Press
2. Cryogenic Research and Applications: Marshal Sitting/ Von Nostrand/ Inc. New Jersey
3. Cryogenic Heat Transfer/ R.F.Baron

REFERENCE BOOKS:

1. Experimental Techniques in Low Temperature Physics- O.K. White, Oxford Press, 1968
2. Cryogenic Process Engineering/ K.D. Timmerhaus & TM Flynn/ Plenum Press, 1998
3. Hand Book of Cryogenic Engineering – J.G.Weisend –II, Taylor and Francis,

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year –I Sem(Thermal Engineering)

L	T/P/D	C
3	0	3

(R18D2105) SOLAR ENERGY TECHNOLOGY
(PROGRAM ELECTIVE-I)

Course Objectives:

- To introduce the basic concepts and novel technologies in solar thermal systems
- Understanding basic characteristics of renewable sources of energy and technologies for their utilization
- To give review on thermal storage of energy
- To provide a balance between both frontier technology updates and existing solar thermal energy strategies, in both quantitative and qualitative way.
- To give review on cost and economics and regulatory rules related to utilization of renewable sources of energy

UNIT-I

Introduction – Solar energy option, specialty and potential – Sun – Earth – Solar radiation, beam and diffuse – measurement – estimation of average solar radiation on horizontal and tilted surfaces – problems – applications.

Capturing solar radiation – physical principles of collection – types – liquid flat plate collectors – construction details – performance analysis – concentrating collection – flat plate collectors with plane reflectors – cylindrical parabolic collectors – Orientation and tracking – Performance Analysis.

UNIT-II

Design of Solar Water Heating System and Layout: Power generation – solar central receiver system – Heliostats and Receiver – Heat transport system – solar distributed receiver system – Power cycles, working fluids and prime movers, concentration ratio.

UNIT-III

Thermal Energy Storage: Introduction – Need for – Methods of sensible heat storage usingsolids and liquids – Packed bed storage – Latent heat storage – working principle – construction – application and limitations. Other solar devices – stills, air heaters, dryers, Solar Ponds & Solar Refrigeration, active and passive heating systems.

UNIT-IV

Direct Energy Conversion: solid-state principles – semiconductors – solar cells –performance – modular construction – applications - conversion efficiencies calculations.

UNIT-V

Economics: Principles of Economic Analysis – Discounted cash flow – Solar system – life cyclecosts – cost benefit analysis and optimization – cost based analysis of water heating and photo voltaic applications.

Course Outcomes:

- Define basic properties of solar energy renewable source of energy and technologies for their Utilization.
- Describe main elements of Solar water heating systems designed for utilization of renewable sources of energy.
- Discuss the aspects of thermal energy storage in relation to natural and human aspects of the environment.
- Undertake simple analysis of DEC principles and performance calculations.
- To understand and analyze the principle of economic analysis in solar photo voltaic application systems.

TEXTBOOKS:

1. Principles of solar engineering/ Kreith and Kerider/Taylor and Franscis/2nd edition.
2. Solar energy thermal processes/ Duffie and Beckman/John Wiley & Sons.
3. Solar energy: Principles of Thermal Collection and Storage/ Sukhatme/TMH/2nd . Edition.

REFERENCE BOOKS:

1. Solar energy/ Garg/TMH.
2. Solar energy/ Magal/Mc Graw Hill.
3. Solar Thermal Engineering Systems / Tiwari and Suneja/Narosa.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

L	T/P/D	C
3	-	3

(R18D2106) TURBO MACHINES
(PROGRAM ELECTIVE-I)

Course Objectives:

- Understand the fundamental concepts of turbo machines.
- Apply concepts of steam nozzles and turbines
- Understand the thermodynamic analysis of centrifugal compressors.
- Understand the axial flow compressors and evaluating their performances in theform of velocity triangles.
- Analyze energy transfer through graphical and analytical methods in axial flow gas turbines

UNIT-I

Fundamentals of Turbo Machines: Classifications, Applications, Thermodynamic analysis, isentropic flow. Energy transfer. Efficiencies, Static and Stagnation conditions, Continuity equations, Euler's flow through variable cross sectional areas, unsteady flow in turbo machines.

UNIT –II

Steam Nozzles: Convergent and Convergent-Divergent nozzles, Energy Balance, Effect of backpressure of analysis. Design of nozzles.

Steam Turbines: Impulse turbines, Compounding, Work done and Velocity triangle, Efficiencies, Constant reactions, Blading, Design of blade passages, Angle and height, Secondary flow. Leakage losses, Thermodynamic analysis of steam turbines.

UNIT-III

Gas Dynamics: Fundamental thermodynamic concepts, isentropic conditions, mach numbers and area, Velocity relations, Dynamic Pressure, Normal shock relation for perfect gas. Supersonic flow, oblique shock waves. Normal shock recoveries, detached shocks, Aerofoil theory.

Centrifugal Compressor: Types, Velocity triangles and efficiencies, Blade passage design, Diffuserand pressure recovery. Slip factor, Stanitz and Stodolas formula's, Effect of inlet mach numbers, Pre whirl, Performance.

UNIT-IV

Axial Flow Compressors: Flow Analysis, Work and velocity triangles, Efficiencies, Thermodynamic analysis. Stage pressure rise, Degree of reaction, Stage Loading, General design, Effect of velocity, Incidence, Performance.

Cascade Analysis: Geometrical and terminology. Blade force, Efficiencies, Losses, Free end force, Vortex Blades.

UNIT-V

Axial Flow Gas Turbines: Work done. Velocity triangle and efficiencies, Thermodynamic flow analysis, Degree of reaction, Zweifels relation, Design cascade analysis, Soderberg, Hawthrone, Ainley, Correlations, Secondary flow, Free vortex blade, Blade angles for variable degree of reaction. Actuator disc, Theory, Stress in blades, Blade assembling, Material and cooling of blades, Performances, Matching of compressors and turbines, off design performance.

Course Outcomes:

- Able to derive the basic equations used for turbo machines.
- Will be able to understand the concept of velocity triangles used for performance evaluation of turbines.
- Analyze the geometric terminologies of axial flow compressors
- Identify and differentiate positive displacement machines and turbo machines
- Able to understand the concept of degree of reaction for axial flow compressors.

TEXTBOOKS:

1. Principles of Turbo Machines/DG Shepherd / Macmillan.
2. Fundamentals of Turbo machinery/William W Perg/John Wiley & Sons.
3. Basic Concepts in Turbo machinery by Grant Ingram.

REFERENCE BOOKS:

1. Element of Gas Dynamics/Yahya/TMH.
2. Principles of Jet Propulsion and Gas Turbine/NJ Zucrow/John Wiley.
3. Textbook Of Turbomachines Si Units by MS Govinde Gowda, AM Nagaraja.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

L	T/P/D	C
3	-	3

(R18D2107) ADVANCED I.C. ENGINES
(PROGRAM ELECTIVE-II)

Course Objectives:

- Analyze engine cycles and the factors responsible for making the cycle different from the ideal cycle.
- To familiarize with volumetric efficiency, turbulent motion, flow characteristics,
- Understand combustion phenomenon in SI engine and CI engines.
- Outline emission formation mechanism of IC engines, its effects and the legislation standards.
- Understand the latest developments in IC Engines and alternate fuels

UNIT-I

Introduction – Historical Review – Engine Types – Design and operating Parameters.
Cycle Analysis: Thermo-chemistry of Fuel – Air mixtures, properties – Ideal Models of Engine cycles– Real Engine cycles - differences and Factors responsible for – Computer Modeling.

UNIT -II

Gas Exchange Processes: Volumetric Efficiency – Flow through ports – Supercharging and Turbo charging.
Charge Motion: Mean velocity and Turbulent characteristics – Swirl, Squish – Pre-chamber Engine flows.

UNIT -III

Engine Combustion in SI Engines: Combustion and Speed – Cyclic Variations – Ignition –Abnormal combustion Fuel factors, MPFI, SI engine testing.
Combustion in CI Engines: Essential Features – Types off Cycle. Pr. Data – Fuel
Spray Behavior – Ignition Delay – Mixing Formation and control, Common rail fuel injection system.

UNIT -IV

Pollutant Formation and Control: Nature and extent of problems – Nitrogen Oxides, Carbon monoxide, unburnt Hydrocarbon and particulate – Emissions – Measurement – Exhaust Gas Treatment, Catalytic converter, SCR, Particulate Traps, Lean, NO_X, Catalysts.

UNIT -V

Engine Heat Transfer: Importance of heat transfer, heat transfer and engine energy balance, Convective heat transfer, radiation heat transfer, Engine operating characteristics. Fuel supply systems for S.I. and C.I engines to use gaseous fuels like LPG, CNG and Hydrogen.

Modern Trends in IC Engines: Lean Burning and Adiabatic concepts, Rotary Engines, Modification in I.C engines to suit Bio – fuels, HCCI and GDI concepts

Course Outcomes:

- To apply thermodynamics laws in engineering applications.
- To demonstrate thermodynamic analysis to IC engines and describe combustion phenomena in spark ignition and compression ignition engines.
- To apply the knowledge of operating characteristics of common internal combustion engines.
- Evaluate the methods of engine emission control techniques and implement viable alternate fuels.
- Ability and information to follow recent developments about the internal combustion engine technology

TEXTBOOKS:

1. I.C. Engines / V.Ganesan/TMH
2. I.C. Engines Fundamentals/Heywood/TMH
3. I.C. Engines/G.K. Pathak & DK Chevan/ Standerd Publications

REFERENCE BOOKS:

1. I.C. Engines /RK Rajput/Laxmi Publications
2. Computer Simulation of C.I. Engine Process/ V.Ganesan/University Pre
3. Advanced I.C Engines by Senthil.

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(R18D2108) DESIGNOF HEAT EXCHANGERS
(PROGRAM ELECTIVE-II)

Course Objectives:

- To understand the components and importance of heat exchangers used in industry.
- Familiarize with the thermal and stress analysis on various parts of the heat exchangers.
- To understand the heat transfer and design of double pipe heat exchangers.
- Familiarize with the sizing and rating of the heat exchangers for various applications.
- To know the parameters required for the design of condensers and cooling towers.

UNIT-I

Fundamentals of Heat Exchanger: Temperature distribution and its implications types–shell and tube heat exchangers–regenerators and recuperators–analysis of heat exchangers–LMTD and effectiveness method.

UNIT-II

Flow and Stress Analysis: Effectofturbulence–frictionfactor–pressureloss–stressintubes–header sheets and pressure vessels– thermal stresses, shear stresses- types of failures.

UNIT-III

Design Aspects: Heat transfer and pressure loss–flow configuration–effect of baffles–effect of deviations from ideality –design of double pipe-finned tube –shell and tube heat exchangers-simulation of heat exchangers.

UNIT–IV

Compact and Plate Heat Exchangers: Types – merits and demerits – design of compact heat exchangers, plate heat exchangers–performance influencing parameters– limitations

UNIT-V

Condensers and Cooling Towers: Design of surface and evaporative condensers–cooling tower–performance characteristics.

Course Outcomes:

- Abilitytodesigntheheatexchangerbasedontheinformationprovidedforaparticularapplication.
- To analyze the parameters which influence the flow, stress on heat exchangers.
- Ability to design different types of heat exchangers based on flow configuration and heat transfer.
- Analyze problems involved in heat transfer and simulation of heat exchangers.
- Able to design surface and evaporative condensers based on performance characteristics.

TEXT BOOKS:

1. Sadik Kakac and HongtanLiu, Heat Exchangers Selection, Rating and Thermal Design, CRC Press, 2002.
2. Fundamentals of Heat Exchanger Design by Ramesh K. Shah, Dusan P. Sekulic.
3. Plate Heat Exchangers: Design, Applications and Performance by Bengt Sundén, R. M.Manglik.

REFERENCE BOOKS:

1. Arthur. PFrass, Heat Exchanger Design, John Wiley & Sons, 1988
2. Taborek.T, Hewitt.G.F and Afgan.N, Heat Exchangers, Theory and Practice. McGraw-Hill Book.
3. Hewitt.G.F, Shires. G.L and Bott.T.R, Process Heat Transfer, CRC Press, 1994.

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(R18D2109) ENERGY AND ENVIRONMENTAL ENGINEERING (PROGRAM ELECTIVE-II)

Course Objectives:

- To understand Learn the principles of air and water pollution, effect of these pollutants on the environment.
- To know the methods available to control air pollution and water pollution.
- Familiarize with the sources of waste and energy generation from waste.
- Thorough knowledge on energy conservation act and its features.
- Familiarize with the waste heat recovery systems and its applications.

UNIT-I

Introduction to Pollution: Pollution of air, water, and soil; Effect of pollution on living systems

Air Pollution: Sources and classification of air pollutants, Effect of air pollution, Pollution from industries, Chemical reactions in a contaminated atmosphere, urban air pollution, Green house effect, Ozone layer depletion, Acid rain, Photo chemical smog, Meteorological aspects of air pollution.

Air Pollution Sampling and Measurement: Collection of gaseous and particulate pollutants, Analysis of air pollutants – Sulphur dioxide, Nitrogen oxides, Carbon monoxide, Oxidants and Ozone, Hydro carbons and Particulate matter

UNIT–II

Air Pollution Control Methods and Equipment: Cleaning of gaseous effluents, Particulate emission control, Control of specific gaseous pollutants SO2, NOx, Hydrocarbons, CO.

Water Pollution and Control: Types of water pollutants and their effects, Thermal pollution and effects, Water pollution laws and standards, Waste water sampling and analysis, Treatment of waste water (primary, secondary and tertiary treatment processes).

UNIT–III

Waste to Energy Conversion: Sources and classification of wastes, Energy generation from wastes - Biochemical vs. Thermo-chemical Conversion and their environment benefits, Introduction to Biochemical conversion (anaerobic digestion), Thermo-chemical conversion processes direct combustion, incineration, pyrolysis, gasification and liquefaction, Economics of thermo-chemical conversion, Industrial applications of incinerators and gasifiers, Briquetting; Utilization and advantages of briquetting.

UNIT–IV

Energy Conservation in Industry: Energy Conservation and its Importance, Energy Strategy for the Future, The Energy Conservation Act, 2001 and its Features, Energy conservation in Boilers, Steam Turbines and Cooling Towers.

UNIT–V

Waste Heat Recovery: Introduction, Classification and Application, Benefits of Waste Heat Recovery, Development of a Waste Heat Recovery System.

Course Outcomes:

- To analyze the gaseous pollutants such as nitrogen oxides, sulphur dioxide, carbon monoxide etc.
- Ability to justify the use of pollution control equipment and their design.
- Apply the knowledge about the operations of Waste to Energy Plants.
- Carry out Techno-economic feasibility for Waste to Energy Plants.
- To develop and implement waste heat recovery systems.

TEXT BOOKS:

1. "Environmental pollution control engineering" C. S. Rao/New age International . Pvt.Ltd
2. "Air pollution" M.N.Rao and M.V.N.Rao /Tata Mc Graw Hill
3. G.Masters: Introduction to Environmental Engineering and Science Prentice Hall of India Pvt Ltd, NewDelhi -2003.

REFERENCE BOOKS:

1. "Pollution control in process industries" S.P. Mahajan/ Tata Mc Graw Hill
2. "Energy Technology" S.Rao and B.B.Parulekar /Khanna publishers
3. H.S.Peavy, D.R..Rowe, G.Tchobanoglous (1985): Environmental Engineering McGraw- Hill BookCompany, NewYork.

OPEN ELECTIVE-I

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(R18DME51) NON CONVENTIONAL ENERGY SOURCES (OPEN ELECTIVE-I)

Course Objectives:

- To explain the concept of various forms of renewable energy.
- To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications.
- To impart the knowledge of basics of different non conventional types of power generation & power plants in detail.
- Understanding the need and role of Non-Conventional Energy sources particularly when the conventional sources are scarce in nature.
- Student learn different sources and conversion techniques for better society

UNIT-I

Introduction: Energy Scenario, Survey of energy resources. Classification and need for conventional energy resources.

Solar Energy: The Sun-sun-Earth relationship, Basic matter to waste heat energy circuit, Solar Radiation, Attention, Radiation measuring instruments.

Solar Energy Applications: Solar water heating. Space heating, Active and passive heating, Energy storage, Selective surface, Solar stills and ponds, solar refrigeration, Photovoltaic generation.

UNIT -II

Geothermal Energy: Structure of earth, Geothermal Regions, Hot springs. Hot Rocks, HotAquifers. Analytical methods to estimate thermal potential. Harnessing techniques, Electricity generating systems.

UNIT-III

Direct Energy Conversion: Nuclear Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic, Thermionic and Thermoelectric generation and MHD generator.

Hydrogen Gas as Fuel: Production methods, Properties, I.C. Engines applications, Utilization strategy, Performances.

UNIT-IV

Bioenergy: Biomass energy sources. Plant productivity, Biomass wastes, aerobic and anaerobic bioconversion processes, Raw material and properties of bio-gas, Bio-gas plant technology and status, the energetic and economics of biomass systems, Biomass gasification

UNIT-V

Wind Energy: Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types, Betz model. Interference factor. Power coefficient, Torque coefficient and Thrust coefficient, Lift machines and Drag machines. Matching Electricity generation.

Energy from Oceans: Tidal energy, Tides, Diurnal and semi-diurnal nature, Power from tides, Wave Energy, Waves, Theoretical energy available. Calculation of period and phase velocity of waves, Wave power systems, submerged devices. Ocean thermal Energy, Principles, Heat exchangers, Pumping requirements, Practical considerations.

Course Outcomes:

- Students get expertise in analyzing the environmental sources.
- Cost economics of using renewable energy sources compared to fossil fuel.
- Students get exposure on direct energy conversion systems.
- Student expertise the need and role of Non-Conventional Energy sources
- Recognize the need and ability to engage in lifelong learning for further developments in this field

TEXTBOOKS:

1. Non-conventional Energy Sources / GD Rai/Khanna publications.
2. Non-Conventional Energy Sources and Utilisation (Energy Engineering)/ R K Rajput / S.Chand.
3. Renewable Energy Sources /Twidell & Weir/Taylor and Francis/ 2nd special Indian edition .

REFERENCE BOOKS:

1. Renewable Energy Resources- Basic Principles and Applications/ G.N.Tiwari and M.K.Ghosal/ Narosa Publications.
2. Renewable Energy Resources/ John Twidell & Tony Weir/Taylor & Francis/2nd edition.
3. Non Conventional Energy / K.Mittal/ Wheeler.

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(R18DME52) INDUSTRIAL SAFETY
(OPEN ELECTIVE –I)

Course Objectives:

- Students will be able to recognize and evaluate occupational safety and health hazards in the workplace
- To explain the concept of various industrial safety methods.
- To outline division aspects measurements of safety performance.
- Able to analyze the effects of workplace exposures, injuries and illnesses, fatalities
- To determine appropriate hazard controls following the hierarchy of controls

UNIT-I:

Importance of Safety, health and environment. Health safety and environmental policy, fundamentals of safety, classification of accidents, Managements responsibility, objectives of safety management, National safety council, Employees state insurance act 1948, approaches to prevent accidents, principles of safety management, safety organization, safety auditing, maintenance of safety, measurements of safety performance, industrial noise and noise control, Industrial Psychology, Industrial accidents and prevention. Introduction to OSHAS 18001 AND OSHA.

UNIT II:

Process safety management (P.S.M) as per OSHA, legal aspects of safety, safety with respect to plant and machinery, the explosive act 1884, Petroleum act 1934, personal protective equipment, classification of hazards, protection of respiratory system, work permit system, hazards in refineries and process plants, safety in process plants, pollution in some typical process industry.

UNIT III:

Safe working practices, housekeeping, safe working environment, safety device and tools, precaution in use of ladders, safety instruction during crane operation, safety instruction for welding, burning and cutting and gas welding equipment, electrical safety, case studies, safety in use of electricity, electric shock phenomena, Occurrence of electric shock, medical analysis of electric shock and its effect, safety procedures in electric plants, installation of earthing system,

UNIT IV:

Safety in hazardous area, hazard in industrial zones, classification of industrial Enclosures for gases and vapors. Mechanical, Chemical, Environmental and Radiation hazards, Machine guards and safety devices, slings, load limits, lifting tackles and lifting equipment, hydrostatic test, Chemical hazards, industrial toxicology, toxic chemicals and its harmful effects on humans, factors influencing the effect

of toxic materials, Units of concentration, control measure, environmental hazards, devices for measuring radiation, safety analysis and risk analysis, risk management, First aid, Safety measures to avoid occupational diseases.

UNIT V

Factories act – 1948Stuatutory authorities – inspecting staff, health, safety, provisions relating to hazardous processes, welfare, working hours, employment of young persons – special provisions – penalties and procedures- Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules – electricity act and rules.

Course Outcome:

- Evaluate workplace to determine the existence of occupational safety and health hazards
- Identify relevant regulatory and national consensus standards along with best practices that are applicable
- Educate students about how to reduce work place hazards and to encourage the standard of Safety, Health & Environment programme , so as to aim 0% accidents and 100% safety in different industries in which Industrial Safety plays an important role.
- Select appropriate control methodologies based on the hierarchy of controls
- This has the blending mixture of both Learning and Skills.

Text Books:

1. Industrial safety management By: L.M. Deshmukh Publishers: Tata Mcgraw Hill ,New Delhi Year: 2006 Edition: First
2. The Factories Act 1948, Madras Book Agency, Chennai, 2000

References:

1. Industrial safety health and environment Management system By: R.K. Jain & Sunil S. Rao Publishers: Khanna Publishers Year: 2008 Edition: Second
2..The Indian boilers act 1923, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.
3.. ”Accident prevention manual for industrial operations”, N.S.C.,Chicago, 1982.
4. Industrial Safety and Environment by Amit Gupta
5.“Safety in Industry” N.V. Krishnan Jaico Publishery House, 1996.

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(R18DME53) OPERATIONS RESEARCH
(OPEN ELECTIVE –I)

Course Objectives:

- To familiarize the students with the use of practice oriented mathematical applications for optimization functions in an organization.
- To familiarize the students with various tools of optimization, probability, statistics and simulation,
- To applicable in particular scenarios in industry for better management of various resources.
- To develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language.
- Understandable to the decision-making processes in Management Engineering.

UNIT–I

Introduction: Development – Definition– Characteristics and Phases – Types of models – operation Research models– applications.

Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method.

UNIT–II

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

Sequencing – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

UNIT–III

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

Theory of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT–IV

Waiting Lines: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

UNIT–V

Dynamic Programming: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Simulation Languages.

Course Outcomes:

- Student will be able to illustrate the need to optimally utilize the resources in various types of industries.
- Apply and analyze mathematical optimization functions to various applications.
- Demonstrate cost effective strategies in various applications in industry.
- Student will be able to implement these Techniques in real Life.
- Student can use this mathematical software to solve the proposed models.

TEXT BOOKS:

1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Hiller &Libermann (TMH).
3. Introduction to O.R /Taha/PHI

REFERENCE BOOKS:

1. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson . Education.
2. Operations Research / R.Pannerselvam,PHI Publications.
3. Operation Research /J.K.Sharma/MacMilan.

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(R18DHS51) BUSINESS ANALYTICS
(OPEN ELECTIVE –I)

Course Objectives:

- To understand the importance of ever-increasing volume, variety and velocity of data in organization and application of data analytical tools for decision making.
- Students will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities and aspire to add value to society.
- Students will effectively communicate using business specific terminology in written and verbal form.
- Students will utilize interpersonal and leadership skills to be highly effective business managers and leaders.
- Students will have a strategic understanding of business analytics.

Unit-I: Introduction to Business Analytics: Importance, Scope, Evolution, Classification, and Application; Data Structure-Visualization of Data, Data Architecture, Measurement Scale; Decision Models-Classification, Structure of Decision Models; Data Structure and Data View-Understanding of data, exploring data using pivot tables.

Unit-II: Descriptive Analytics: Descriptive Statistical Measures–Population and samples, Measures of location, Measures of Dispersion, Measures of variability, measures of Association. Probability distribution and Data Modeling – Discrete Probability distribution, Continuous Probability distribution, Random sampling from Probability Distribution, Data Modeling and Distribution fitting.

Unit-III: Predictive Analytics: Karl Pearson Correlation Techniques -Multiple Correlation-Spearman's Rank correlation-Simple and Multiple regression-Regression by the method of least squares –Building good regression models –Regression with categorical independent variables --Linear Discriminant Analysis-One way and Two Way ANOVA

Unit-IV: Data Mining: Scope of Data Mining, Data Exploration and Reduction, Unsupervised learning –cluster analysis, Association rules, Supervised learning-Partition Data, Classification Accuracy, prediction Accuracy, k-nearest neighbors, Classification and regression trees, Logistics Regression.

Unit-V: Simulation: Random Number Generation, Monte Carlo Simulation, What if Analysis, Verification and Validation, Advantages and Disadvantages of Simulation, Risk Analysis, Decision Tree Analysis.

References:

- James Evans, Business Analytics, 2e, Pearson.
- Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney, Williams Essential of Business Analytics, Cengage Learning.
- Thomas Eri, Wajid Khattack & Paul Buhler: Big Data Fundamentals, Concepts, drivers and Techniques by Prentice Hall of India, New Delhi.
- Akil Maheswari: Big Data, Upskill ahead by Tata McGraw Hill, New Delhi.
- Seema Acharya & Subhashini Chellappan: Big Data and Analytics, Wiley Publications, New Delhi.
- S. Christian Albright, Wayne L. Winston: Business Analytics: Data Analysis & Decision Making, Cengage Learning

CourseOutcomes:

- Students will be able to understand Importance of Analytics.
- Students will be able to understand Understanding the analytical tools.
- Students will be able to understand Application of Analytical tools to solve business problems.
- Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.
- Analyze and evaluate appropriate business strategies, practices, and theories that inform and guide organizations to ensure sustainability.

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(R18DCS51) SCRIPTING LANGUAGES
(OPEN ELECTIVE – I)

Course Objectives:

- Motivation for and applications of scripting.
- Difference between scripting languages and non- scripting languages.
- Types of scripting languages.
- Scripting languages such as PERL, PHP,TCL/TK, python and BASH.
- Creation of programs in the Linux environment.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL-Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance per l - finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming Php and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

Course Outcomes:

- Ability to create and run scripts using PERL/TCl/Python/PHP in IC design flow.
- Be familiar with design issues of object-oriented and functional languages.
- Be familiar with language abstraction constructs of classes, interfaces, packages, and procedures.
- Be familiar with using functional languages.
- Ability to use Linux environment and write programs for automation of scripts in VLSI tool design flow.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

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(R18DAE51) MATHEMATICAL MODELING TECHNIQUES
(OPEN ELECTIVE-I)

Course Objectives

- The objective is to emphasize the importance of mathematical modeling of diverse engineering problems.
- Specifically aerospace problems will be discoursed to understand the need for numerical techniques
- To introduce optimization techniques into numerical problems to reduce problem data.
- Identify a problem and choose an appropriate mathematical model.
- Solve the problem using the appropriate technology if necessary.

UNIT-I: **INTRODUCTION TO MODELING AND SINGULAR PERTURBATION METHODS**

Definition of a model, Procedure of modeling: problem identification, model formulation, reduction, analysis, Computation, model validation, Choosing the model, Singular Perturbations: Elementary boundary layer theory, Matched asymptotic expansions, Inner layers, nonlinear oscillations

UNIT-II: **VARIATIONAL PRINCIPLES AND RANDOM SYSTEMS**

Variational calculus: Euler's equation, Integrals and missing variables, Constraints and Lagrange multipliers, Variational problems: Optics-Fermat's principle, Analytical mechanics: Hamilton's principle, Symmetry: Noether's theorem, Rigid body motion, Random systems: Random variables, Stochastic processes, Monte Carlo method

UNIT-III: **FINITE DIFFERENCES: ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS**

ODE: Numerical approximations, Runge-Kutta methods, Beyond Runge-Kutta, PDE: Hyperbolic equations-waves, Parabolic equations-diffusion, Elliptic equations-boundary values

CELLULAR AUTOMATA AND LATTICE GASES

Lattice gases and fluids, Cellular automata and computing

UNIT- IV: **FUNCTION FITTING AND TRANSFORMS**

Function fitting: Model estimation, Least squares, Linear least squares: Singular value decomposition, Non-linear least squares: Levenberg-Marquardt method, Estimation, Fisher information, and Cramer-Rao inequality, Transforms: Orthogonal transforms, Fourier transforms, Wavelets, Principal components

FUNCTION FITTING ARCHITECTURES

Polynomials: Pade approximants, Splines, Orthogonal functions, Radial basis functions, Over-fitting, Neural networks: Back propagation, Regularization

UNIT-V: **OPTIMIZATION AND SEARCH**

Multidimensional search, Local minima, Simulated annealing, Genetic algorithms

FILTERING AND STATE ESTIMATION

Matched filters, Wiener filters, Kalman filters, Non-linearity and entrainment, Hidden Markov models

Course Outcomes:

- Student will be able to predict and develop a numerical framework to a problem of physical interest.
- Student will be able to choose different techniques to solve various problems of diverse engineering, more especially to aeronautics and aerospace.
- Student will also enable to choose better optimized solutions using different optimization techniques.
- Students will develop understanding of various mathematical concepts and modeling techniques required for successful application of mathematics.
- Student will be able to model data using the language and techniques of mathematics.

TEXT BOOK:

1. The Nature of Mathematical Modeling, Neil Gershenfeld, Cambridge University Press, 2006,ISBN 0-521-57095-6

REFERENCE BOOKS:

1. Mathematical Models in the Applied Sciences, A. C. Fowler, Cambridge University Press, 1997,ISBN 0-521-46140-5
2. A First Course in Mathematical Modeling, F. R. Giordano, M.D. Weir and W.P. Fox, 2003,Thomson, Brooks/Cole Publishers
3. Applied Numerical Modeling for Engineers, Donald De Cogan, Anne De Cogan, Oxford University Press, 1997

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(R18DEC51) EMBEDDED SYSTEMS PROGRAMMING (OPEN ELECTIVE –I)

Course Objectives

- To have knowledge about the basic programming of an embedded system.
- To provide in-depth knowledge about embedded processor, its hardware and software.
- To explain real time operating systems, inter-task communication and an embedded software development tool.
- To acquire knowledge about embedded processors and their applications.
- Test a real application of Embedded system on Board

Unit 1 - Embedded OS (Linux) Internals

Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication - Semaphore, Pipes, FIFO, Shared Memory

Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling.

Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network

Unit 2 – Open source RTOS

Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Matric in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS.

Unit 3 – Open Source RTOS Issues

POSIX standards, RTOS Issues - Selecting a Real Time Operating System, RTOS comparative study. Converting a normal Linux kernel to real time kernel, Xenomai basics.

Overview of Open source RTOS for Embedded systems (Free RTOS/ Chibios-RT) and application development.

Unit 4 – VxWorks / Free RTOS

VxWorks/ Free RTOS Scheduling and Task Management - Realtime scheduling, Task Creation, Inter task Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems - General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral

Unit 5 – Case study

Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board ().Testing a real time application on the board

Course Outcomes

- Ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
- Ability to port an Embedded OS/ RTOS to a target board.
- Foster ability to understand the design concept of embedded systems.
- Ability to integrate hardware and software for embedded applications systems.
- Foster ability to understand the design concept of embedded systems.

TEXT BOOKS:

1. Essential Linux Device Drivers, Venkateswaran Sreekrishnan
2. Writing Linux Device Drivers: A Guide with Exercises, J. Cooperstein
3. Real Time Concepts for Embedded Systems – Qing Li, Elsevier

REFERENCES:

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill
2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK
3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17the IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society
4. Real-time Systems – Jane Liu, PH 2000
5. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A
6. Structured Development for Real - Time Systems V1 : Introduction and Tools: Ward, Paul T & Mellor, Stephen J
7. Structured Development for Real - Time Systems V2 : Essential Modeling Techniques: Ward, Paul T & Mellor, Stephen J
8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J
9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H
10. Embedded Software Primer: Simon, David E.
11. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech I Year – I Sem (Thermal Engineering)

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(R18D2181) THERMAL ENGINEERING LABORATORY

Course Objectives:

- To understand the working principles of I.C. engines.
- To learn the testing methods used to measure the performance parameters of an engine.
- To demonstrate and conduct experiments.
- Familiarize with the solar panel power systems.
- To understand the working principles of refrigeration systems.

LIST OF EXPERIMENTS:

1. Load test on four stroke single cylinder diesel engine using biodiesels
2. Measurement of Burning Velocity of premixed flame.
3. To study V-I characteristics of solar panel
4. Performance test and analysis of exhaust gases of an I.C engine.
5. Heat balance sheet, volumetric efficiency and air fuel ratio estimation of an I.C. . engine.
6. COP estimation of vapor compression refrigeration system.
7. To estimate power generation from solar photovoltaic system.
8. Performance analysis of heat pipe.
9. To study the performance of solar flat plate collector.
10. A study on Evacuative tube concentrator.

Course Outcomes:

At the end of the course the learners will be able to

- Analyze the performance and exhaust emissions of an IC engine.
- Evaluate the performance of the Vapor compression and Air conditioning units.
- Analyze the flame propagation velocity of the gaseous fuels.
- Evaluate the performance of the solar flat plate collector and evacuated tube concentrator.
- To carry out the test on power generation and V-I characteristics of solar power systems.

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(R18DHS55) DISASTER MANAGEMENT
(AUDIT COURSE –I)

Course Objective:

- Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
- Understand the four work objectives of the disaster manager.
- They Know the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful.
- To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
- To ensure skills and ability to design, implement and evaluate research on disasters.

Unit-I: **Introduction to Disaster Management:** Definition, Nature, Types and Magnitude. Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters

Unit-II: Consequences of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Pre-Disaster Management- Early Warning and Prediction Systems: Role of IT, RS, GIS, GPS and ICS

Unit-III: **Global Perspective (Natural Disasters):** History of Disasters And Types of Hazards: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides & Avalanches.

Unit-IV: Global Perspective (Man-Made Disasters): Study of Environmental Impacts Induced By Human Activity, Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

Unit-V: Disaster Management and Planning: Post Disaster Management Planning: Management of Essential Supplies and Temporary Shelter Relief, Evacuation & other Logistic Management, Site Management, Medical Trauma and Stress Management, Integrated Developmental Planning For Disaster Management

Course Outcomes:

- Students will be able to affirm the usefulness of integrating management principles in disaster mitigation work.
- Students can distinguish between the different approaches needed to manage pre- during and post- disaster periods.
- Understanding foundations of hazards, disasters and associated natural/social phenomena.
- Familiarity with disaster management theory (cycle, phases).
- Capacity to manage the Public Health aspects of the disasters.

Reference Books:

- Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
- Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
- Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
- Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
- Government of India, 1997, Vulnerability Atlas of India, New Delhi.
- Sahni, Pardeep Et.Al. (Eds.) 2002, Disaster Mitigation Experiences and Reflections. Prentice Hall of India, New Delhi.

SEMESTER-II
SYLLABUS

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(R18D2110) FUELS, COMBUSTION AND ENVIRONMENT

Course Objectives:

- Provide students with knowledge of fuel quantity and engine technology effects on emissions. Understand the combustion phenomena.
- Understand the concept of laminar and turbulent flame propagation. To give students the basic understanding of the thermodynamics of combustion process.
- To equip students with the knowledge of the important chemical reactions occurring in combustion engines their rates and control. .
- To study the flame structure of premixed and diffusion flames.
- Enabling them to know the use of different techniques for determination of thermal and transport properties of commercial fuels.

UNIT–I

Fuels: Detailed classification – Conventional and Unconventional Solid, Liquid, gaseous fuels and nuclear fuels – Origin of Coal – Analysis of coal. Coal – Carborisation, Gasification and liquefaction – Lignite: petroleum based fuels – problems associated with very low calorific value gases: Coal Gas – Blast Furnace Gas Alcohols and Biogas.

UNIT–II

Principles of Combustion: Chemical composition – Flue gas analysis – dew point of products– Combustion stoichiometry. Chemical kinetics – Rate of reaction – Reaction order – Molecularity – Zeroth, first, second and third order reactions – complex reactions – chain reactions. Theories of reaction Kinetics – General oxidation behavior of HC's.

UNIT–III

Thermodynamics of Combustion: Enthalpy of formation – Heating value of fuel – Adiabatic flame Temperature – Equilibrium composition of gaseous mixtures.

UNIT–IV

Laminar and Turbulent Flames Propagation and Structure: Flame stability –Burning velocity of fuels – Measurement of burning velocity – factors affecting the burning velocity. Combustion of fuel, droplets and sprays – Combustion systems – Pulverized fuel furnaces – fixed Entrained and Fluidised Bed Systems.

UNIT–V

Environmental Considerations: Air pollution – Effects on Environment, Human Health etc. Principal pollutants – Legislative Measures – Methods of Emission control.

Course Outcomes:

- Extend their knowledge of fuels and engines to different situations of engineering context and professional practice.
- Understand about different methods to reduce air pollution The flame temperature of commercial fuels burning in the combustion chambers of internal combustion engines
- The rate of chemical reactions and emission characteristics of hydrocarbon fuels used in power plants and transportation sector.
- The burning velocity of premixed flames and important combustion characteristics of diffusion flames.
- Thermodynamic and transport properties of fuels at elevated pressures and temperatures prevalent in the combustion chambers of actual engines

TEXTBOOKS:

1. Combustion Fundamentals / Roger A strehlow / Mc Graw Hill
2. Fuels and combustion / Sharma and Chander Mohan/ Tata Mc Graw Hill
3. Combustion Engineering and Fuel Technology / Shaha A.K./ Oxford and IBH.

REFERENCE BOOKS:

1. Combustion / Sarkar / Mc. Graw Hill.
2. An Introduction to Combustion / Stephen R. Turns/ Mc. Graw Hill International . Edition.
3. Combustion Engineering / Gary L. Berman & Kenneth W. Ragland/ Mc. Graw Hill International Edition

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(R18D2111) COMPUTATIONAL FLUID DYNAMICS

Course Objectives:

- To develop finite difference and finite volume discredited forms of the CFD equations.
- To formulate explicit & implicit algorithms for solving the Euler Equations & Navier Stokes Equations.
- Equip students with the knowledge base essential for application of computational fluid dynamics to engineering flow problems.
- Provide the essential numerical background for solving the partial differential equations governing the fluid flow
- Develop students' skills of using a commercial software package

UNIT-I

Introduction: Finite difference method, finite volume method, finite element method, governing equations and boundary conditions, Derivation of finite difference equations.

Solution Methods: Solution methods of elliptical equations — finite difference formulations, interactive solution methods, direct method with Gaussian elimination.

Parabolic equations-explicit schemes and Von Neumann stability analysis, implicit schemes, alternating direction implicit schemes, approximate factorization, fractional step methods, direct method with tridiagonal matrix algorithm.

UNIT–II

Hyperbolic Equations: Explicit schemes and Von Neumann stability analysis, implicit schemes, multi step methods, nonlinear problems, second order one-dimensional wave equations.

Burgers equations: Explicit and implicit schemes, Runge-Kutta method.

UNIT–III

Formulations of Incompressible Viscous Flows: Formulations of incompressible viscous flows by finite difference methods, pressure correction methods, vortex methods.

Treatment of compressible flows: potential equation, Euler equations, Navier-stokes system of equations, flow field-dependent variation methods, boundary conditions, example problems.

UNIT-IV

Finite Volume Method: Finite volume method via finite difference method, formulations for two and three-dimensional problems.

UNIT–V

Standard Variational Methods: Linear fluid flow problems, steady state problems, Transient problems.

Course Outcomes:

- Derive the basic governing equations applied for fluid flow problems.
- Apply the differential equations to fluid flow problems.
- Understand the concept of discretization.
- Solve simple algorithms for incompressible fluid flow.
- Understand solution of aerodynamic flows.
- Appraise & compare current CFD software.
  Simplify flow problems and solve them exactly

TEXTBOOKS:

1. Text book of fluid dynamics/ Frank Choriton/ CBS Publishers & distributors, 1985
2. Numerical heat transfer and fluid flow / Suhas V. Patankar/ Hema shava Publishers corporation & Mc Graw Hill.
3. Computational Fluid Flow and Heat Transfer/ Muralidaran/ Narosa Publications

REFERENCE BOOKS:

1. Computational Fluid Dynamics: Basics with applications/John D. Anderson/ Mc Graw Hill.
2. Fundamentals of Computational Fluid Dynamics/Tapan K. Sengupta / Universities . Press.
3. Introduction to Theoretical and Computational Fluid Dynamics/C. Pozrikidis /Oxford . University Press/2nd Edition

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(R18D2112) ADVANCED FINITE ELEMENT ANALYSIS

Course Objectives:

- Gain a fundamental understanding of the finite element method for solving boundary value problems.
- Learn important concepts of variation form, minimum potential energy principles, and method of weighted residuals.
- Study one dimensional problems such as truss, beam, and frame members, two-dimensional problems such as plain stress and plain strain elasticity problems, torsion problem.
- Provide complements of Solid and Structural mechanics required for the FEA contents.
- Provide detailed understanding of using FEA to solve advanced structural and solid mechanics problems involving material nonlinearity.

UNIT-I

Introduction to FEM: Basic concepts, historical back ground, applications of FEM, general description, comparison of FEM with other methods, variation approach, Glerkin's Methods. Co-ordinates, basic element shapes, interpolation function, Virtual energy principle, Rayleigh – Ritz method, properties of stiffness matrix, treatment of boundary conditions, solution of system of equations, shape functions and characteristics, Basic equations of elasticity, strain- displacement relations.

UNIT-II

1-D Structural Problems: Axial bar element – stiffness matrix, load vector, temperature effects, Quadratic shape functions and problems.
Analysis of Trusses: Plane Trusses and Space Truss elements and problems.
Analysis of Beams: Hermite shape functions – stiffness matrix – Load vector – Problems.

UNIT-III

2-D Problems: CST, LST, force terms, Stiffness matrix and load vectors, boundary conditions, Iso parametric elements – quadrilateral element, shape functions – Numerical Integration.
Finite element modeling of Axi-symmetric solids subjected to Axi-symmetric loading with triangular elements.
3-D Problems: Tetra hedran element – Jacobian matrix – Stiffness matrix.

UNIT-VI

Scalar Field Problems: 1-D Heat conduction-Slabs – fins - 2-D heat conduction problems – Introduction to Torsional problems.

UNIT-V

Dynamic Considerations And Dynamic Equations – consistent mass matrix – Eigen Values, Eigen vector, natural frequencies – mode shapes – modal analysis.

Course Outcomes:

- Apply the concepts of minimum potential energy principles to solve structural mechanics problems.
- Compute Eigen values and eigenvectors of simple dynamic systems
- Obtain weak form from strong form and total potential, and recognize similarities . between such solutions, and those obtained by variational principles and principal of . virtual work.
- Able to demonstrate knowledge of the fundamental concepts of using FEA to model buckling of structures.
- Able to demonstrate knowledge of the fundamental concepts of the theory of plasticity.

TEXTBOOKS:

1. The Finite Element Methods in Engineering / SS Rao / Pergamon.
2. Finite Element Methods: Basic Concepts and applications, Alavala, PHI
3. Introduction to Finite Elements in Engineering, Chandrupatla, Ashok and Belegundu, Prentice – Hall

REFERENCE BOOKS:

1. Introduction to Fininte element analysis- S.Md.Jalaludeen,Anuradha Publications, . print-. 2012
2. A First Course in the Finite Element Method/Daryl L Logan/Cengage Learning/5th . Edition
3. Finite Element Method – Krishna Murthy / TMH

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(R18D2113) ENERGY MANAGEMENT
(PROGRAM Elective- III)

Course Objectives:

- To understand the principles associated with effective energy management and to apply these principles in the day-to-day life.
- To minimise energy costs / waste without affecting production & quality.
- To minimize environmental effects.
- To gain exposure to energy auditing.
- To understand the principles associated with effective energy management and to apply these principles in the day-to-day life.

UNIT-I

Introduction: Principles of energy management. Managerial organization, Functional areas for i)manufacturing industry, ii) Process industry, iii) Commerce, iv) Government, Role of Energy manager in each of these organizations. Initiating, Organizing and managing energy management programs

UNIT-II

Energy Audit: Definition and concepts. Types of energy audits, Basic energy concepts, Resources for plant energy studies. Data gathering, Analytical techniques. Energy Conservation: Technologies for energy conservation, Design for conservation of energy materials, Energy flow networks. Critical assessment of energy usage. Formulation of objectives and constrains, Synthesis of alternative options and technical analysis of options. Process integration.

UNIT-III

Economic Analysis: Scope, Characterization of an investment project. Types of depreciation, Time value of money. Budget considerations, Risk analysis.

UNIT-IV

Methods of Evaluation of Projects: Payback, Annualized costs, Investor's rate of return,Present worth, Internal rate of return, Pros and cons of the common method of analysis, Replacement analysis.

UNIT-V

Alternative Energy Sources: Solar energy- Types of devices for solar energy collections, Thermal storage system, Control systems. Wind Energy, Availability, Wind Devices, Wind Characteristics, performance of turbines and systems.

Course Outcomes:

- Understanding of energy conservation and identification of energy conservation opportunities in various industrial processes

- Knowledge of various tools and components of energy auditing
- Understanding of energy conservation and identification of energy conservation opportunities in various industrial processes
- Will be able to analyse and estimate the costs involved in completion of a project.
- Gains knowledge about the importance of alternative energy sources in the present scenario.

TEXTBOOKS:

1. Energy Management Hand Book / W.C. Turner (Ed)
2. Energy Management Principles / CB Smith/ Pergamum Press
3. Energy Audits: A Workbook for Energy Management in Buildings by E-book by Tarik Al-Shemmeri

REFERENCE BOOKS:

1. Energy Management / W.R.Murthy and G.Mc.Kay / BS Publication
2. Management / H.Koontz and Cyrill Donnel / McGraw Hill
3. Energy Management Hand Book, BSR Publications.

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(R18D2114) INDUSTRIALREFRIGERATION SYSTEMS
(PROGRAM ELECTIVE- III)

Course Objectives:

- To provide concepts of Refrigeration systems in residential, commercial and industrial buildings.
- To impart knowledge of various compressors
- To educate about various system components and accessories of refrigeration systems like evaporators and condensers
- To learn about cycle analysis pertaining to Refrigeration systems.
- To learn about energy conservation and design cinderations

UNIT-I

Introduction: Introductiontoindustrialrefrigeration-differencefromconventionalsystem-applications–industrial and comfort air -conditioning-conditions for high COP.

UNIT-II

Compressors: Reciprocating and screw compressor: Multistage industrial applications, cylinder arrangement, cooling methods- oil injection and refrigeration injection, capacity regulations-Economizers.

UNIT-III

Evaporator sand Condensers: Types of Evaporators, Liquid circulation: Mechanical pumping and gas pumping-advantage and disadvantage of liquid re-circulation-circulation ratio-top feed and bottom feed refrigerant-Net Positive Suction Head(NPSH)-two pumping vessel system-suction risers– design –piping loses. Different Industrial Condensers arrangement, Evaporators-Types and arrangement, liquid circulation, type of feed, refrigerant tipping design, functional aspects. Lubricating oil: types-physical properties, types of circulation and oil separator.

UNIT-IV

Vessels in Industrial Refrigeration: High pressure receiver, flash tank, liquid and vapour separator, separation enhancers, low pressure receivers, surge drum, surge line accumulator, thermosyphon receiver and oil pots.

UNIT-V

Energy Conservation and Design Considerations- Source of losses, energy efficient components, and heat reclaim thermal storage, ice builder and ice harvester.

Insulation: critical thickness, insulation cost and energy cost, vapour barriers, construction methods of refrigerated spaces.

Course Outcome:

- To enable students to demonstrate and apply knowledge of design, select components for, and prepare design documents for industrial Refrigeration systems.
- Analyze performance of compressors in refrigeration system
- Study the working principles of evaporators and condensers of refrigeration system.
- Study the vessels that used in Industrial refrigeration systems
- Evaluate energy conservation and design methods in air conditioning system

TEXTBOOKS:

1. WilbertF.Stoecker, Industrial Refrigeration HandBook,McGraw-Hill,1998.
2. ASHRAEHandBook: Fundamentals,1997.
3. ASHRAEHandBook: Refrigeration,1998.

REFERENCE BOOKS:

1. ASHRAEHandBook: HVAC SystemsandEquipment,1996.
2. TransportpropertiesofSUVARefrigerants, Du-PontChemicals,1993.
3. Refrigeration and Air Conditioning Technology by Bill Whitman, Bill Johnson, John Tomczyk &Eugene Silberstein.

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(R18D2115) JET PROPULSION AND ROCKET ENGINES (PROGRAMELECTIVE-III)

Course Objectives:

- Develop an understanding of how air-breathing engines and chemical rockets produce thrust.
- Analyze the characteristics of the nozzle.
- Working knowledge of the basic operation and design requirements of propulsion turbo machinery components (inlets, compressors, combustors, turbines, afterburners, and nozzles).
- Carry out performance analysis rockets.
- To study the Ramjet Engine propulsion system

UNIT-I

Turbo Jet Propulsion System: Gas turbine cycle analysis – layout of turbo jet engine. Turbo machinery- compressors and turbines, combustor, blade aerodynamics, engine off design performance analysis.

Flight Performance: Forces acting on vehicle – Basic relations of motion – multi stage vehicles.

UNIT-II

Principles of Jet Propulsion and Rocket Engines : Fundamentals of jet propulsion, Rockets and air breathing jet engines – Classification – turbo jet , turbo fan, turbo prop, rocket (Solid and Liquid propellant rockets) and Ramjet engines.

Nozzle Theory and Characteristics Parameters: Theory of one dimensional convergent – divergent nozzles – aerodynamic choking of nozzles and mass flow through a nozzle – nozzle exhaust velocity – thrust, thrust coefficient, A_c / A_t of a nozzle, Supersonic nozzle shape, non-adapted nozzles, summer field criteria, departure from simple analysis – characteristic parameters – 1) characteristic velocity, 2) specific impulse 3) total impulse 4) relationship between the characteristic parameters 5) nozzle efficiency, combustion efficiency and overall efficiency.

UNIT-III

Aero Thermo Chemistry of the Combustion Products: Review of properties of mixture of gases – Gibbs – Dalton laws – Equivalent ratio, enthalpy changes in reactions, heat of reaction and heat of formation – calculation of adiabatic flame temperature and specific impulse – frozen and equilibrium flows.

Solid Propulsion System: Solid propellants – classification, homogeneous and heterogeneous propellants, double base propellant compositions and manufacturing methods. Composite propellant oxidizers and binders. Effect of binder on propellant properties. Burning rate and burning

rate laws, factors influencing the burning rate, methods of determining burning rates.

UNIT-IV

Solid Propellant Rocket Engine – internal ballistics, equilibrium motor operation and equilibrium pressure to various parameters. Transient and pseudo equilibrium operation, end burning and burning grains, grain design. Rocket motor hard ware design. Heat transfer considerations in solid rocket motor design. Ignition system, simple pyro devices.

Liquid Rocket Propulsion System: Liquid propellants – classification, Mono and Bi propellants, Cryogenic and storage propellants, ignition delay of hypergolic propellants, physical and chemical characteristics of liquid propellant. Liquid propellant rocket engine – system layout, pump and pressure feed systems, feed system components. Design of combustion chamber, characteristic length, constructional features, and chamber wall stresses. Heat transfer and cooling aspects. Un cooled engines, injectors – various types, injection patterns, injector characteristics, and atomization and drop size distribution, propellant tank design.

UNIT-V

Ramjet and Integral Rocket Ramjet Propulsion System: Fuel rich solid propellants, gross thrust, gross thrust coefficient, combustion efficiency of ramjet engine, air intakes and their classification – critical, super critical and sub-critical operation of air intakes, engine intake matching, classification and comparison of IIRR propulsion systems.

Course Outcomes:

- Analyze the thrust in air-breathing engines and rockets.
- Characterize the performance and operating/design constraints for inlets, compressors, combustors, turbines and nozzles
- Calculate energy release, e.g., adiabatic flame temperatures, and equilibrium composition of gases at known temperature and pressure
- Analyze the thermodynamic performance of simple chemical and electrical rocket cycles and compute relevant performance parameters
- An understanding of Ramjet and Integral Ramjet Propulsion System.

TEXTBOOKS:

1. Mechanics and Dynamics of Propulsion/ Hill and Peterson/John Wiley & Sons.
2. Rocket propulsion elements/Sutton/John Wiley & Sons/8th Edition.
3. Gas Turbines/Ganesan /TMH.

REFERENCE BOOKS:

1. Gas Turbines & Propulsive Systems/Khajuria & Dubey/Dhanpat Rai & Sons.
2. Rocket propulsion/Bevere.
3. Jet propulsion /Nicholas Cumpsty.

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(R18D2116) THERMAL AND NUCLEAR POWER PLANTS (PROGRAM ELECTIVE-IV)

Course Objectives:

- Provide awareness about resources of energies available in India for Power Production by Thermal and Nuclear Processes.
- Understand and know the requirements for a Thermal Power Plant and Nuclear Power Plant, from sources to consumption and economics of power plants.
- Study and learn the processes and cycles followed in Thermal Power Plants and nuclear power plants and components used in the power plants.
- Gain the knowledge on steam power plants, steam generators and gas turbine power plants, their analyses on fuel and fluidized bed combustion, ash handling systems.
- Understanding the power plant instrumentation

UNIT–I

Introduction: Sources of energy, Type of Power plants. Direct energy conversion system, Energy sources in India, Recent developments in power generation, Combustion of coal, Volumetric analysis, Gravimetric analysis. Fuel gas analysis.

Steam Power Plant: Introduction. General layout of steam power plant, Modern coal. Fired Steam, Steam power plant. Power plant cycle, Fuel Handling, Combustion equipment, Ash handling, Dust collectors.

Steam Generators: Types, Accessories. Feed water heaters, Performance of boiling, Water treatment, Cooling towers, and Steam turbines. Compounding of turbines, Steam condensers, Jet and surface condensers.

UNIT-II

Gas Turbine Power Plant: Cogeneration. Combined cycle power plant, Analysis, Waste heat recovery, IGCC power plant, Fluidized bed, Combustion, Advantages, and Disadvantages.

UNIT-III

Nuclear Power Plant: Nuclear physics, Nuclear Reactor, Classification, Types of reactors, Site selection. Method of enriching uranium. Application of nuclear power plant. Nuclear Power Plant Safety: Bi-Product of nuclear power generation, Economics of nuclear power plant, Nuclear power plant in India, Future of nuclear power.

UNIT-IV

Economics of Power Generation: Factors affecting the economics, Loading factors, Utilization factor, Performance and operating characteristics of power plant, Point economic load sharing, Depreciation. Energy rate, Criteria for optimum loading. Specific economic energy problem.

UNIT-V

Power Plant Instrumentations: Classification, Pressure measuring instrument, Temperature measurement and Flow Measurement, Analysis of combustion gases, Pollution types, Methods of control.

Course Outcomes:

- Describe and analyze different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation.
- Gain the knowledge about resources of energies available in India for Power Production by Thermal and Nuclear Processes.
- Analyze the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts
- Analyze the processes and cycles followed in Thermal Power Plants and nuclear power plants and components used in the power plants and identify the losses to get better efficiency.
- Describe the working principle and basic components of measuring instruments of power plant and pollution control methods involved with it.

TEXTBOOKS:

1. Power Plant Engineering / P.K.Nag/ TMH.
2. Power Plant Engineering / R.K.Rajput / Lakshmi Publications.
3. Power Plant Engineering, by Samsher Gautam, First Edition.

REFERENCE BOOKS:

1. Power Plant Engineering / P.C.Sharma / Kotearia Publications.
2. Power Plant Technology / Wakil.
3. Power Plant Engineering by A.K. Raja, Amit Prakash Srivastava,Manish Dwivedi.

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(R18D2117) THERMAL MEASUREMENTS AND PROCESS CONTROLS (PROGRAM ELECTIVE-IV)

Course Objectives:

- Educate the student with operating principles and function of measuring instruments used in Engineering and process industries
- Make the student conversant with various working principles of instruments
- Understand and analyze the behavioral characteristics of instruments
- Make the student learn about calibration procedure the instrument
- Educate the student about the fundamental aspects of control systems and their use in the context of industry applications

UNIT-I

General Concepts: Fundamental elements of a measuring instrument. Static and dynamic characteristics – errors in instruments – Different methods of measurement and their analysis – Sensing elements and transducers.

Measurement of pressure – principles of pressure measurement, static and dynamic pressure, vacuum and high pressure measuring – Measurement of low pressure, Manometers, Calibration methods, Dynamic characteristics- design principles.

UNIT-II

Measurement of Flow: Obstruction meters, variable area meters. Pressure probes, compressible fluid flow measurement, Thermal anemometers, calibration of flow measuring instruments. Introduction to design of flow measuring instruments.

UNIT-III

Temperature Measurement: Different principles of Temperature Measurement, use ofbimetallic thermometers – Mercury thermometers, Vapor Pressure thermometers, Thermo positive elements, thermocouples in series & parallel, pyrometry, measurement of heat flux, calibration of temperature measuring instruments and design of temperature measuring instruments.

UNIT-IV

Level Measurement: Direct & indirect methods, manometric methods, float level meters, electrical conductivity, Capacitive, Ultrasonic, and Nucleonic Methods.

Measurement of density – Hydrometer, continuous weight method, Gamma rays, Gas impulse wheel. Velocity Measurement – Coefficient of viscosity, Ostesld method, free fall of piston under gravity, torque method. Measurement of moisture content and humidity. Measurement of thermal conductivity of solids, liquids and gases.

UNIT-V

Process Control: Introduction and need for process control principles, transfer functions, block diagrams, signal flow graphs, open and closed loop control systems – Analysis of First & Second order systems with examples of mechanical and thermal systems. Control System Evaluation – Stability, steady state regulations, transient regulations.

Course Outcomes:

- Making the student conversant with different working principles of various instruments
- Making the student to learn in the transduction of the signals
- Student can be able to analyze the behavior of an instrument in the measurement process
- Be able to analyze and design an instrumentation system, dealing with the concepts of dynamic range, signal noise ratio, and error budget
- Build, program, calibrate and use a microprocessor-based instrumentation system

TEXTBOOKS:

1. Measurement System, Application & Design – E.O. Doeblin.
2. Mechanical and Industrial Measurements – R.K. Jain – Khanna Publishers.
3. Applied Thermal Engineering, Design. Processes. Equipment. Economics by T.S. Zhao

REFERENCE BOOKS:

1. Mechanical Measurements – Buck & Beckwith – Pearson.
2. Control Systems, Principles & Design, 2nd Edition – M. Gopal – TMH.
3. Thermal processing quality and Principles by George Awuah, Hosahalli S . Ramaswamy, AEconomides.

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(R18D2118) REFRIGERATION AND AIR CONDITIONING (PROGRAM ELECTIVE-IV)

Course Objectives:

- Learning the fundamental principles and different methods of refrigeration and air conditioning.
- Study of various refrigeration cycles and evaluate performance using Mollier charts and/ or refrigerant property tables.
- Comparative study of different refrigerants with respect to properties, applications and environmental issues.
- Understand the basic air conditioning processes on psychometric charts, calculate cooling load for its applications in comfort and industrial air conditioning.
- Study of the various air conditioning operating principles, and cooling load estimation

UNIT–I

Vapour Compression Refrigeration: Performance of Complete vapor compression system.
Components of Vapor Compression System: The condensing unit – Evaporators – Expansion valve – Refrigerants – Properties – ODP & GWP - Load balancing of vapor compression Unit.
Compound Compression: Flash inter-cooling – flash chamber – Multi-evaporator & Multistage systems.

UNIT–II

Production of Low Temperature: Liquefaction system, Cascade System – Applications.–Dry ice system.
Vapor absorption system – Simple and modified aqua – ammonia system – Representation on Enthalpy –Concentration diagram. Lithium – Bromide system Three fluid system – HCOP.

UNIT–III

Air Refrigeration: Applications – Air Craft Refrigeration - Simple, Bootstrap, Regenerative and Reduced ambient systems – Problems based on different systems.
Steam Jet refrigeration system: Representation on T-s and h-s diagrams – limitations and applications.
Unconventional Refrigeration System – Thermo-electric – Vortex tube & Pulse tube – working principles.

UNIT–IV

Air Conditioning: Psychometric properties and processes – Construction of Psychometric chart. Requirements of Comfort Air –conditioning – Thermodynamics of human body – Effective temperature and Comfort chart – Parameters influencing the Effective Temperature. Summer, winter and year round air – conditioning systems.

Cooling load Estimation: Occupants, equipments, infiltration, duet heat gain fan load, Fresh air load.

UNIT–V

Air Conditioning Systems: All Fresh air, Re-circulated air with and without bypass, withreheat systems – Calculation of Bypass Factor, ADP, RSHF, ESHF and GSHF for different systems.

Components: Humidification and dehumidification equipment – Systems of Air cleaning – Grills and diffusers – Fans and blowers – Measurement and control of Temperature and Humidity.

Course Outcomes:

- Illustrate the fundamental principles and applications of refrigeration and air conditioning system
- Obtain cooling capacity and coefficient of performance by conducting test on vapor compression refrigeration systems
- Present the properties, applications and environmental issues of different refrigerants
- Calculate cooling load for air conditioning systems used for various applications
- Operate and analyze the refrigeration and air conditioning systems.

Use P-h, T-S and Psychrometric charts to solve refrigeration and Air conditioning design

TEXTBOOKS:

1. Refrigeration & Air Conditioning /C.P. Arora/TMH.
2. Refrigeration & Air Conditioning /Arora & Domkundwar/ Dhanpat Rai.
3. Refrigeration and Air Conditioning /Manohar Prasad.

REFERENCE BOOKS:

1. Principles of Refrigeration/ Dossat /Pearson.
2. Refrigeration and Air Conditioning /Ananthanarayana /TMH.
3. Refrigeration and Air Conditioning /Jordan& Preister /Prentice Hall.

OPEN ELECTIVE-II

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(R18DME54) COMPOSITE MATERIALS
(OPEN ELECTIVE –II)

Course Objectives:

- To be familiar with classification and characteristics of composite material and their applications.
- To gain the knowledge about manufacturing methods of composites.
- To know the testing methods related to composite materials.
- To understand and analyze problems on macro mechanical behavior of laminate
- Understanding of failure theories and methods of joining

UNIT-I

Introduction: Definitions, Composites, Reinforcements and matrices, Types of reinforcements, Types of matrices, Types of composites, Carbon Fibre composites, Properties of composites in comparison with standard materials, Applications of metal, ceramic and polymer matrix composites.

UNIT-II

Manufacturing methods: Hand and spray lay - up, injection molding, resin injection, filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.

UNIT-III

Mechanical Properties -Stiffness and Strength: Geometrical aspects – volume and weight fraction. Unidirectional continuous fibre, discontinuous fibers, Short fiber systems, woven reinforcements – Mechanical Testing: Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.

UNIT-IV

Laminates: Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Plate Stiffness and Compliance, Computation of Stresses, Types of Laminates -, Symmetric Laminates, Anti-symmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Cross-ply Laminate, Angle-ply Laminate. Orthotropic Laminate, Laminate Moduli, Hygro thermal Stresses.

UNIT-V

Joining Methods and Failure Theories: Joining –Advantages and disadvantages of adhesive and mechanically fastened joints. Typical bond strengths and test procedures.

Course Outcomes:

- To provide knowledge on characteristics of composites.
- To get knowledge on manufacturing and testing methods and mechanical behavior of composites.
- To get the exposure mechanical properties of different materials.
- Ability to analyze problems on macro mechanical behavior of laminate and failure and joining theories involved in.

TEXT BOOKS:

1. K.K. Chawla, (1998), Composite Materials, Springer-Verlag, New York
2. B.T. Astrom, (1997), Manufacturing of Polymer Composites, Chapman & Hall
3. Composite materials by J.N.Reddy

REFERENCE BOOKS:

1. Stuart M Lee, J. Ian Gray, Miltz, (1989), Reference Book for Composites Technology, CRC press
2. Frank L Matthews and R D Rawlings, (2006), Composite Materials: Engineering and Science, Taylor and Francis.
3. D. Hull and T.W. Clyne, (1996), Introduction to Composite Materials, Cambridge University Press
4. Analysis and Performance of Fiber Composites by Bhagwan D. Agarwal
5. Mechanics of Composite Materials by Autar K. Kaw

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(R18DME55) WASTE TO ENERGY
(OPEN ELECTIVE –II)

Prerequisite: Renewable Energy Sources, Physics, Environmental Studies

Course Objectives:

- To classify solid waste sources
- To identify methods of solid waste disposal
- To study various energy generation methods
- To analyse biogas production methods and recycling of e-waste
- To understand Ewaste and its hazards

UNIT- I :Solid Waste Sources Solid Waste Sources, types, composition, Properties, Global warming, Municipal Solid Waste: Physical, chemical and biological properties , Waste Collection and, Transfer stations, Waste minimization and recycling of municipal waste, Segregation of waste, Size Reduction , Managing Waste. Status of technologies for generation of Energy from Waste Treatment and Disposal Aerobic composting, incineration, Furnace type and design, Medical waste /Pharmaceutical waste treatment Technologies, incineration, Environmental impacts, Measures to mitigate environmental effects due to incineration.

UNIT – II: Land Fill method of Solid waste disposal Land fill classification, Types, methods and Sitting consideration, Layout and preliminary design of landfills: Composition, characteristics, generation, Movement and control of landfill leach ate and gases, Environmental monitoring system for land fill gases.

UNIT – III: Energy Generation from Waste Bio-chemical Conversion: Sources of energy generation, anaerobic digestion of sewage and municipal wastes, direct combustion of MSW-refuse derived solid fuel, Industrial waste, agro residues, Anaerobic Digestion.

UNIT – IV: Biogas production, Land fill gas generation and utilization, Thermo-chemical conversion: Sources of energy generation, Gasification of waste using Gasifiers, Briquetting, Utilization and advantages of briquetting, Environmental benefits of Bio-chemical and Thermo- chemical conversion.

UNIT – V: E-waste: e-waste in the global context – Growth of Electrical and Electronics Industry in India – Environmental concerns and health hazards – Recycling e-waste: a thriving economy of the unorganized sector – Global trade in hazardous waste – impact of hazardous e-waste in India. Management of e-waste: e-waste legislation, Government regulations on e-waste management – International experience – need for stringent health safeguards and environmental protection laws of India.

Course Outcomes: Up on the completion of the subject, the student will be able to

- Apply the knowledge about the operations of Waste to Energy Plants.
- Analyse the various aspects of Waste to Energy Management Systems.
- Carry out Techno-economic feasibility for Waste to Energy Plants.
- Apply the knowledge in planning and operations of Waste to Energy plants.
- Understand e-waste management and disposals.

TEXT BOOKS:

1. Nicholas P. Cheremisinoff. Handbook of Solid Waste Management and Waste Minimization Technologies. An Imprint of Elsevier, New Delhi (2003).
2. P. Aarne Vesilind, William A. Worrell and Debra R. Reinhart. Solid Waste Engineering. Thomson Asia Pte Ltd. Singapore (2002)
3. M. Dutta , B. P. Parida, B. K. Guha and T. R. Surkrishnan. Industrial Solid Waste Management and Landfilling practice. Narosa Publishing House, New Delhi (1999).
4. "E-waste in India: Research unit, Rajya Sabha Secretariat, New Delhi, June 2011"
5. Amalendu Bagchi. Design, construction and Monitoring of Landfills. John Wiley and Sons. New York. (1994)
6. M. L. Davis and D. A. Cornwell. Introduction to environmental engineering. Mc Graw Hill International Edition, Singapore (2008)
7. C. S. Rao. Environmental Pollution Control Engineering. Wiley Eastern Ltd. New Delhi (1995)
8. S. K. Agarwal. Industrial Environment Assessment and Strategy. APH Publishing Corporation. New Delhi (!996)
9. Sofer, Samir S. (ed.), Zaborsky, R. (ed.), "Biomass Conversion Processes for Energy and Fuels", New York, Plenum Press, 1981
10. Hagerty, D.Joseph; Pavoni, Joseph L; Heer, John E., "Solid Waste Management", New York, Van Nostrand, 1973
11. George Tchobanoglous, Hilary Theisen and Samuel Vigil Prsl: Tchobanoglous, George Theisen, Hillary Vigil, Samuel, "Integrated Solid Waste management: Engineering Principles and Management issues", New York, McGraw Hill, 1993.

REFERENCES:

- C Parker and T Roberts (Ed), Energy from Waste – An Evaluation of Conversion Technologies, Elsevier Applied Science, London, 1985

- KL Shah, Basics of Solid and Hazardous Waste Management Technology, Prentice Hall, 2000 3. M Datta, Waste Disposal in Engineered Landfills, Narosa Publishing House, 1997
- G Rich et.al, Hazardous Waste Management Technology, Podvan Publishers, 1987
- AD Bhide, BB Sundaresan, Solid Waste Management in Developing Countries, INSDOC, New Delhi,1983 FUEL CELL AND

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(R18DME56) INDUSTRIAL MANAGEMENT
(OPEN ELECTIVE-II)

Course Objectives:

- This course is intended to familiarize the students with the framework for the managers and leaders
- The student able to understanding and making decisions relating to issues related organizational structure, production operations, marketing
- The student learns about Human resource Management, product management and strategy.
- The student will be able to learn the concepts of PERT&CPM.
- This course will help in preparing variable control charts, and R charts, attributes control charts, p charts and c charts.

UNIT- I

Concepts of Management and Organisation - Functions of Management - Evolution of Management Thought : Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc-Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Hertzberg's Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs - Systems Approach to Management.

UNIT –II

Designing Organisational Structures : Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundary less organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT –III

Plant location, definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant- Matrix approach. Plant Layout - definition, objectives, types of production, types of plant layout - various data analyzing forms-travel chart.

Work study - Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts-difference between micro motion and memo motion studies. Work measurement- definition, time study, steps involved-equipment, different methods of performance

rating- allowances, standard time calculation. Work Sampling - definition, steps involved, standard time calculations, differences with time study.

UNIT –IV

Materials Management-Objectives, Inventory - functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems-Continuous review system-periodical review system. Stores Management and Stores Records. Purchase management, duties of purchase of manager, associated forms. Introduction to PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times estimation-programme evaluation review techniques- Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT –V

Inspection and quality control, types of inspections - Statistical Quality Control-techniques-variables and attributes-assignable and non assignable causes- variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Introduction to TQM-Quality Circles, ISO 9000 series procedures. Introduction to Human Resource Management, Functions of HRM, Job Evaluation, different types of evaluation methods. Job description, Merit Rating.- difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs selling, marketing mix, product lifecycle.

Course Outcomes:

- Plan an organizational structure for a given context in the organization carry out production operations through Work study and carry out production operations through Work study.
- Understand the markets, customers and competition better and price the given products appropriately and ensure quality for a given product or service.
- Student will be capable of rating the performance of project.
- Plan and control the HR function better and plan, schedule and control projectthrough PERT and CPM,evolve a strategy for a business or service organization.
- Capable of inspecting the quality of production and control the quality.

TEXT BOOKS:

1. Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition, 2004.
2. Industrial Engineering and Management O.P. Khanna Dhanpat Rai.
3. A.R.Aryasri, Management Science , Tata McGraw-Hill, 2002.

REFERENCE BOOKS:

1. Panner Selvam, Production and Operations Management, PHI, 2004.
2. Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy, Reliability Engineering & Quality Engineering, Galgotia Publications, Pvt., Limited.
3. Phillip Kotler, Marketing Management, Pearson, 2004.

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(R18DHS52) COST MANAGEMENT OF ENGINEERING PROJECTS (OPEN ELECTIVE –II)

Course Objective:

- Project Cost management is concerned with the process of planning and controlling the budget of a project or business.
- The Cost Management course addresses activities such as planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.
- To make student be capable of taking the decisions in different situations.
- To make student capable of solving Problems on Material and Labor variances.
- To make student capable to perform Audit.

Unit-I:

Introduction to Project Cost Management: Concept of project cost management - objectives and scope- Elements of project costs: functional classification and ascertainment of cost (material, labour and overhead costs) –Preparation of a cost sheet for an engineering project

Unit-II:

Method of Project Costing: Single Output/ Unit Costing: Activity Based Costing - Job Costing - Batch Costing - Contract Costing - Process/ Operation Costing

Unit-III:

Marginal Cost: Marginal Costing – Nature and Scope- Applications - Break even charts and Point, Decision Making (all types with full problems) Differential Cost Analysis, Advantages and Disadvantages of Marginal Costing.

Unit-IV:

Project Budgetary Control: Objectives of Project Budgetary control - Functional Project Budgets - Master Budgets - Key Factor Problems on Production Budgets and Flexible Budgets. Standard Costing- Comparison with Budgetary control, analysis of Variances, Simple Problems on Material and Labor variances only.

Unit-V: Project Cost Audit & Reporting to Management: Objectives and advantages of Project Cost Audit – Project Cost Audit report - Management Audit - Objectives and Scope. Reporting to Management – Purpose of reporting- Requisites of a good report, Classifications of Report, Segment reporting.

Course Outcome:

- The student is able to understand the detailed cost concepts, cost structure and elements of costs of manufacturing and service organizations.
- The student is capable of establishing the method of project costing.
- To learn the reporting system of the organization for effective decision making, planning, evaluation and control.
- Student will be able to control the budget for the project.
- Understands the importance of objectives and advantages of project cost audit.

Reference Books

- Project Estimating and Cost Management, Project Management Essential Library, Berrett-Koehler Publishers (October 1, 2001)
- Project Management Accounting,: Budgeting, Tracking, and Reporting Costs and Profitability, Wiley; 2 edition (June 28, 2011) by Kevin R. Callahan, Gary S. Stetz , Lynne M. Brooks
- Cost and Management Accounting 2014, by S.P. Jain & K.L. Narang
- Cost and Management Accounting, New Age International by M.E. Thukaram Rao
- Advanced Cost & Management Accounting – Problems & Solutions, Prentice Hall of India (P) Ltd. by V.K. Saxena & C.D. Vashist
- Studies in Cost Management, Sultan Chand & Sons by S.N. Maheshwari

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(R18DCS52) INFORMATION SECURITY
(OPEN ELECTIVE – II)

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.
Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)
IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

Course Outcomes:

- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.
- Able to understand the importance of web security.
- Student gains knowledge of Organizational Roles and Responsibilities for Security Audit.
- Understands the Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

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(R18DAE52) UNMANNED AIR VEHICLES
(OPEN ELECTIVE –II)

Course Objectives:

- To make the student understand the roles of unmanned aircraft.
- Acquire the knowledge of various disciplines contributing to the design, development and deployment of UAVs
- To make student understand how to avoid Mid-air Collision (MAC).
- The student will be able to understand the concepts of ground testing.
- Develop and deploy the UAV systems

UNIT-I: INTRODUCTION TO UNMANNED AIRCRAFT SYSTEMS

Applications of UAS, categories of UAV systems, roles of unmanned aircraft, composition of UAV system.

UNIT-II: DESIGN OF UAV SYSTEMS-I

Introduction to design and selection of the systems-conceptual phase, preliminary design, detailed design; Aerodynamics and airframe configurations-Lift-induced Drag, Parasitic Drag, Rotary-wing Aerodynamics, Response to Air Turbulence, Airframe Configurations; Medium-range, Tactical Aircraft, Characteristics of Aircraft Types-Long-endurance, Long-range Role Aircraft, Medium-range, Tactical Aircraft, Close-range/Battlefield Aircraft, MUAV Types, MAV and NAV Types, UCAV, Novel Hybrid Aircraft Configurations, Aspects of Airframe Design: Scale Effects, Packaging Density, Aerodynamics, Structures and Mechanisms, Selection of power- plants, Modular Construction, Ancillary Equipment, Design for Stealth: Acoustic Signature, Visual Signature, Thermal Signature, Radio/Radar Signature, Payload Types: Non-dispensable and dispensable payloads.

UNIT-III: DESIGN OF UAV SYSTEMS-II

Communications-Communication Media, Radio Communication, Mid-air Collision (MAC) Avoidance, Communications Data Rate and Bandwidth Usage, Antenna Type; Control and Stability: HTOL Aircraft, Convertible Rotor Aircraft, Payload Control, Sensors, Autonomy; Navigation: NAVSTAR Global Positioning System (GPS), TACAN, LORAN C, Inertial Navigation, Radio Tracking, Way-point Navigation; Launch and Recovery.

Design for Reliability: Determination of the Required Level of Reliability, Achieving Reliability, Reliability Data Presentation, Multiplexed Systems, Reliability by Design, Design for Ease of Maintenance; Design for Manufacture and Development

UNIT-IV: THE DEVELOPMENT OF UAV SYSTEMS

System Development and Certification-System Development, Certification, Establishing Reliability; System Ground Testing: UAV Component Testing, UAV Sub- assembly and Sub-system Testing, Testing Complete UAV, Control Station Testing, Catapult Launch System Tests, Documentation; System In- flight Testing: Test Sites, Preparation for In-flight Testing, In- flight Testing, System certification.

UNIT-V: DEPLOYMENT AND FUTURE OF UAV SYSTEMS

Operational trials and full certification; UAV System Deployment- Network-centric Operations (NCO), Teaming with Manned and Other Unmanned System; Naval, arm and air force roles, civilian, paramilitary and commercial roles.

Course Outcomes:

- The student gains knowledge about composition of UAV system.
- The student will be able to understand the design concepts of UAVs
- The student will be able to understand the electronic instrumentation associated with the UAVs
- The student acquires knowledge about sub assembly and subsystem testing.
- The student attains knowledge about Network-centric Operations (NCO).

Text Books:

1. Reg Austin, Wiley, “Unmanned Aircraft Systems, UAVS Design and Deployment”, 2nd Edition, 2010.

Reference Books:

1. Richard K. Barnhart, Stephen B. Hottman, Douglas M. Marshall, Eric Shappee, (eds.), “Introduction to Unmanned Aircraft Systems”, CRC Press, 2012.
2. Valavanis, Kimon P., Vachtsevanos, George J. “Handbook of Unmanned Aerial Vehicles” AIAA series, 3rd Edition, 2004.

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(R18DEC52) RESEARCH METHODOLOGY
(OPEN ELECTIVE – II)

Course Objectives

- Demonstrate the ability to choose methods appropriate to research aims and objectives
- Identify appropriate research topics
- Prepare a project proposal (to undertake a project) • organize and conduct research (advanced project) in a more appropriate manner
- Write a research report and thesis
- Write a research proposal (grants)

UNIT - I

Introduction: Research objective and motivation, Types of research, Research approaches, Significance, Research method vs. methodology, Research process.

UNIT - II

Formulating a research problem: Literature review, Formulation of objectives, Establishing Operational definitions, Identifying variables, constructing hypotheses.

UNIT - III

Research design and Data Collection: Need and Characteristics, Types of research design, Principles of Experimental research design, Method of data collection, Ethical issues in collecting data.

UNIT - IV

Sampling and Analysis of data: Need of Sampling, Sampling distributions, Central limit theorem, Estimation: mean and variance, Selection of sample size Statistics in research, Measures of Central tendency, Dispersion, asymmetry and relationships, Correlation and Regression analysis, Displaying data

UNIT - V

Hypothesis Testing: Procedure, Hypothesis testing for difference in mean, variance limitations, Chi-square test, Analysis of variance (ANOVA), Basic principles and techniques of writing a Research Proposal

Text Books:

1. R. C. Kothari, Research Methodology: Methods and Techniques, 2nd edition, New Age International Publisher, 2009

2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition, SAGE, 2005

Course Outcomes:

- Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
- Construct a coherent research proposal that includes an abstract, introduction, literature review, research questions, ethical considerations, and methodology
- Have basic knowledge on qualitative research techniques
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Have basic awareness of data analysis-and hypothesis testing procedures

References:

1. Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/>
2. (Electronic Version): StatSoft, Inc. (2012). Electronic Statistics Textbook. Tulsa, OK: StatSoft. WEB: http://www.statsoft.com/textbook/.(Printed Version): Hill, T. & Lewicki, P. (2007). STATISTICS: Methods and Applications. StatSoft, Tulsa, OK.

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(R18D2182) COMPUTATIONAL METHODS LABORATARY

Course Objectives:

- To build the strong foundation in Mathematics of students needed for the field of electronics and Telecommunication Engineering
- To provide students with mathematics fundamentals necessary to formulate, solve and analyses complex engineering problems.
- To prepare student to apply reasoning informed by the contextual knowledge to engineering practice.
- To prepare students to work as part of teams on multi-disciplinary projects.
- Linear differential equations of higher order using analytical methods and numerical methods applicable to Control systems and Network analysis.

LIST OF EXPERIMENTS:

1. Solution for the one dimensional wave equations using explicit method of lax using finite difference method (code development)
2. Solution for the one dimensional heat conduction equation using explicit method using finite difference method (code development)
3. Numerical simulation of Flat plate boundary layer using FEM software
4. Numerical simulation of Laminar flow through pipe using FEM software
5. Numerical simulation of Flow past cylinder using FEM software
6. Numerical simulation of flow through nozzle using FEM software
7. Numerical simulation of combustion using FEM software
8. Simulation of Compressible flow in convergent divergent nozzle.
9. Simulation of compressible flow in a compressor.
10. Six degrees of freedom simulation F-16 model.

Note: Any Ten Experiments can be conducted.

Equipment Needed:

1. **Computers**: Core 2 duo processor with 1 GB RAM
2. **Soft wares:** Matlab or scilab and Ansys

Course Outcomes:

- Students will demonstrate basic knowledge of Laplace Transform., Vector differentiation and differentiation Integration.
- Students will demonstrate an ability to identify and Model the problems of the field of Electronics and Telecommunication and solve it.
- Students will be able to apply the application of Mathematics in Telecommunication Engineering

- Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.

Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields

Reference Books:

1. MATLAB an Introduction with Applications Fifth Edition AMOS GILAT by WILEY Publications
2. Programming in SCI lab by VINU V DAS New Age International Publications
3. ANSYS FLUENT and CFX Tutorials

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(R18DHS56) ENGLISH FOR RESEARCH PAPER WRITING (AUDIT COURSE –II)

Course Objectives:

- To enable the students to use linguistic structures to form well-organized texts in research contexts.
- To improve the quality of a composition by using appropriate cohesive devices.
- To enhance the mechanics of writing skills using correct grammar and vocabulary.
- To equip learners with the strategies of error – free writing.
- To get complete knowledge to write the research paper.

INTRODUCTION

Writing a research paper is a significant part of any academia. It is a substantial piece of academic writing in which the author does independent investigation into a topic and writes a description of the findings of that study. Research studies are important because these contribute to a scholar's knowledge and also provides solutions to the latest challenges. Writing forces one to think about what he believes and what he wants to communicate. Since good writing skills allow a learner to communicate his message with clarity, an extensive exposure on techniques of writing research paper proves to be an immense value to the students .

SYLLABUS

Unit 1 - Sentence Formation
Word order, Structuring paragraphs, Breaking up long sentences

Unit 2 - Cohesive devices
Types of cohesive devices - Anaphoric reference, Cataphoric reference, Exophoric reference
Tense agreement

Unit 3 – Academic Vocabulary
Hedging, Transitions – Additive, Adversative, Causal, Sequential

Unit 4– Grammar for Research Papers
Active & Passive, Punctuation, Articles

Unit 5 – Academic writing

Removing redundancy, Avoiding ambiguity, Paraphrasing, Sample Abstracts for practice, Sample videos

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERENCE BOOKS:

1. English for Writing Research Papers. Adrian Wallwork, edition II, Springer, 2016.
2. Handbook of Technical Writing. James H. Shelton, McGraw Hill, 1994
3. Writing the Research Paper, a handbook. 8th edition, Anthony C. Winkler, Jo Ray Metherell, Wadsworth, 2012

Course Outcomes:

Students will be able to:

- Write in a clear, coherent, and direct style appropriate for academic research
- Draft coherent and unified paragraphs with adequate supporting details.
- Develop the strategy to use lexical terms effectively.
- Adopt appropriate syntactic and semantic techniques
- Demonstrate analytical and inferencing skills.
- Comprehend and employ the various forms of scholarly composition.

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(R18D2183) SEMINAR-I

Course Objectives:

- Understand the diverse field in Mechanical Engineering
- Understand the themes of this seminar
- Identify, understand and discuss current
- Understand the history of Mechanical research
- Identifies real-world issues

Course Outcomes:

- Learn and integrate
- Think and Create
- Communicate
- Clarify Purpose and Perspective
- Practice and use multiple thinking strategies to examine real- world issues

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(R18D2191) MINI PROJECT

Course Objectives:

- To be able to apply some of the techniques/principles you have been taught
- To carry out budget and time planning for the project.
- To inculcate implementation skills by basics of design using an appropriate analysis tool.
- To follow correct simulation practices
- To do effective methodology in the mini project

Course Outcomes:

- Demonstrate a through and systematic understanding of project contents.
- Understand methodologies and professional way of documentation and communication.
- Know the key stages in development of the project.
- Extend or use the idea in mini project.
- Create new ideas with the help of fundamentals of Mechanical Engineering

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech II Year –I Sem (Thermal Engineering)

L	T/P/D	C
-	-	8

(R18D2192) PROJECT REVIEW-I

Course Objectives:

- To provide an opportunity to work in group on a topic / problem / experimentation.
- To encourage creative thinking process.
- To provide an opportunity to analyze and discuss the results to draw conclusions.
- To acquire and apply fundamental principles of planning and carrying out the work plan project through observations, discussions and decision making process.
- To acquire the knowledge to publishing papers in peer reviewed journals/conference proceedings

Course Outcomes:

- Identify methods and materials to carry out experiments/develop code.
- Reorganize the procedures with a concern for society, environment and ethics.
- Analyze and discuss the results to draw valid conclusions.
- Prepare a report as per recommended format and defend the work.
- Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech II Year – II Sem (Thermal Engineering)

L	T/P/D	C
-	-	2

(R18D2184) SEMINAR-II

Course Objectives:

- Understand the diverse field in Mechanical Engineering
- Understand the themes of this seminar
- Identify, understand and discuss current
- Understand the history of Mechanical research
- Identifies real-world issues

Course Outcomes:

- Learn and integrate
- Think and Create
- Communicate
- Clarify Purpose and Perspective
- Practice and use multiple thinking strategies to examine real- world issues

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech II Year – II Sem (Thermal Engineering)

L	T/P/D	C
-	-	8

(R18D2193) PROJECT REVIEW-II

Course Objectives:

- To provide an opportunity to work in group on a topic / problem / experimentation.
- To encourage creative thinking process.
- To provide an opportunity to analyze and discuss the results to draw conclusions.
- To acquire and apply fundamental principles of planning and carrying out the work plan project through observations, discussions and decision making process.
- To acquire the knowledge to publishing papers in peer reviewed journals/conference proceedings

Course Outcomes:

- Identify methods and materials to carry out experiments/develop code.
- Reorganize the procedures with a concern for society, environment and ethics.
- Analyse and discuss the results to draw valid conclusions.
- Prepare a report as per recommended format and defend the work.
- Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M.Tech II Year – II Sem (Thermal Engineering)

L	T/P/D	C
-	-	8

(R18D2194) PROJECT VIVA- VOCE

Course Objectives:

- Student understand the project and should give the clear explanation about the project
- To provide the foundation of good programming skills by discussing key issues to the design of project.
- To be able to apply some of the techniques/principles students have been taught.
- To enable the students to attend placements and be better performers in their future.
- To familiarize with the various techniques.

Course Outcomes:

- Understand the data requirements and collect data relevant to their research.
- Analyze data and interpret results.
- Develop research design for their topic of research.
- Follow the process related activity and testing techniques to work as team member.
- Implement different system calls for various file handling operations.

MASTER OF TECHNOLOGY
In
MACHINE DESIGN

Course Structure and Syllabus
Department of Mechanical Engineering



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTUH, Hyderabad, Approved by AICTE - Accredited by NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally, Kompally, Secunderabad – 500100, Telangana State, India.

Contact Number: 7207034237, 9133555162, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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MASTER OF TECHNOLOGY
MACHINE DESIGN

DEPARTMENT OF
MECHANICAL ENGINEERING

Course Structure and Syllabus

(Batches admitted from the academic year 2018 - 2020)

Note: The regulations hereunder are subjected to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

*"Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

*"Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.

*"Commission" means University Grants Commission.

*"AICTE" means All India Council for Technical Education.

*"University" means Jawaharlal Nehru Technological University, Hyderabad.

*"College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

*"Program" means:

Master of Technology (M.Tech) degree program

PG Degree Program: M.Tech

*"Branch" means specialization in a program like M.Tech degree program in Mechanical Engineering , M.Tech degree program in Aeronautical Engineering etc.

*"Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

*T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

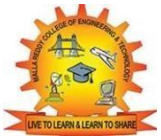
Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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VISION

- To become a model institution in the fields of Engineering Technology and Management.
- To have a perfect synchronization of the ideologies of MRCET with challenging demands of International Pioneering Organizations

MISSION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become pioneers of Indian vision of modern society

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart the quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

ACADEMIC REGULATIONS R-18 FOR M. TECH. (REGULAR) DEGREE COURSE

Academic Regulations of R-18 are applicable for the students of M. Tech. (Regular) Course from the Academic Year 2018-19 and onwards. The M.Tech Degree of Malla Reddy College of Engineering & Technology (MRCET), Secunderabad shall be conferred on candidates who are admitted to the program and who fulfill all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS

Admission to the above program shall be made subject to eligibility, qualification and specialization as prescribed by the University from time to time.

Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University (or) State Government (or) on the basis of any other order of merit as approved by the University, subject to norms as laid down by the State Govt. from time to time.

2.0 AWARD OF M. TECH. DEGREE

2.1. A student shall be declared eligible for the award of the M. Tech. Degree, if he pursues a course of study in not less than two and not more than four academic years.

2.2. A student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the year of his admission, shall forfeit his seat in M. Tech. course.

2.3. The student shall register for all 88 credits and secure all the 88 credits.

2.4. The minimum instruction days in each semester are 90.

3.0 A. COURSE OF STUDY

The following specializations are offered at present for the M. Tech. course of study.

1. Aerospace Engineering
2. Computer Science and Engineering
3. Machine Design
4. System and Signal Processing
5. VLSI and Embedded Systems
6. Thermal Engineering

and any other course as approved by the MRCET from time to time.

3.0 B. Departments offering M. Tech. Programmes with specializations are noted below:

Aeronautical Engineering	Aerospace Engineering
Computer Science Engineering	Computer Science Engineering
Electronics & Communication Engineering	System & Signal Processing
Electronics & Communication Engineering	VLSI and Embedded Systems
Mechanical Engineering	Machine Design
Mechanical Engineering	Thermal Engineering

4.0 ATTENDANCE

The programs are offered on a unit basis with each subject being considered a unit.

4.1 A student shall be eligible to write University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

4.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester shall be granted by the College Academic Committee.

4.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

4.4 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration shall stand cancelled.

4.5 A prescribed fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

4.6 A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

4.7 In order to qualify for the award of the M. Tech. Degree, the candidate shall complete all the academic requirements of the subjects, as per the course structure.

4.8 A student shall not be promoted to the next semester unless he satisfies the minimum academic requirements of the previous semester.

5.0 EVALUATION

The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks for theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

For the theory subjects 70 marks shall be awarded based on the performance in the End Semester Examination and 30 marks shall be awarded based on the Internal Examination Evaluation. The internal evaluation consists of two mid-term examinations each covering descriptive paper 24 marks which consists of six questions and answers any four questions, each carrying 6 marks a total duration of 2 hours. Average of the two mid-term examinations shall be taken as the final marks secured by each candidate. Six (6) marks are allocated for Assignments (as specified by the subject teacher concerned). The total marks secured by the student in mid-term examination and assignment are evaluated for 30 marks.

However, any student scoring internal marks less than 40% will be given a chance to write the internal exam once again after he/she re-registering for the concerned subject and paying stipulated fees as per the norms.

5.1 The end semesters examination will be conducted for 70 marks with 5 questions consisting of two questions each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carries 14 marks.

5.2 For practical subjects, 70 marks shall be awarded based on the performance in the

End Semester Examinations and 30 marks shall be awarded based on the day-to-day performance as Internal Marks.

5.3 There shall be two seminar presentations during I year I semester and II semester respectively. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Departmental Academic Committee consisting of Head of the Department, Supervisor and two other senior faculty members of the department. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.

5.4 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End semester Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Examination taken together.

5.5 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.4) he has to reappear for the End semester Examination in that subject.

5.6 A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and so has failed in the end examination. In such a case, the candidate must re-register for the subject(s) and secure the required minimum attendance. The candidate's attendance in the re-registered subject(s) shall be calculated separately to decide upon his eligibility for writing the end examination in those subject(s). In the event of the student taking another chance, his internal marks and end examination marks obtained in the previous attempt stand cancelled.

5.7 In case the candidate secures less than the required attendance in any subject, he shall not be permitted to write the End Examination in that subject. He shall re-register the subject when next offered.

5.8 Laboratory examination for M. Tech. courses must be conducted with two Examiners, one of them being the Laboratory Class Teacher and the second examiner shall be another Laboratory Teacher.

6.0 EVALUATION OF PROJECT/DISSERTATION WORK

Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

6.1 A Project Review Committee (PRC) shall be constituted with Principal as Chairperson, Heads of all the Departments offering the M. Tech. programs and two other senior faculty members.

6.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.

6.3 After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the Departmental Academic Committee for approval. Only after obtaining the approval of the Departmental Academic Committee can the student initiate the Project work.

6.4 If a candidate wishes to change his supervisor or topic of the project, he can

do so with the approval of the Departmental Academic Committee. However, the Departmental Academic Committee shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

6.5 A candidate shall submit his status report in a bound-form in two stages at least with a gap of 3 months between them.

6.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of theory and practical course with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Principal through Head of the Department and make an oral presentation before the PRC.

6.7 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/School/Institute.

6.8 The thesis shall be adjudicated by one examiner selected by the University. For this, the Principal of the College shall submit a panel of 5 examiners, eminent in that field, with the help of the guide concerned and head of the department.

6.9 If the report of the examiner is not favorable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected.

6.10 If the report of the examiner is favorable, Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the Thesis. The Board shall jointly report the candidate's work as one of the following:

A. Excellent
B. Good
C. Satisfactory
D. Unsatisfactory

The Head of the Department shall coordinate and make arrangements for the conduct of Viva- Voce examination.

If the report of the Viva-Voce is unsatisfactory, the candidate shall retake the Viva-Voce examination only after three months. If he fails to get a satisfactory report at the second Viva- Voce examination, he will not be eligible for the award of the degree.

7.0 AWARD OF DEGREE AND CLASS

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the Credit Based Semester System (CBCS).

Letter Grades and Grade Points:

The UGC recommends a 10-point grading system with the following letter grades as given below:

Grades	Points	Marks secured (%)
O (Outstanding)	10	≥ 85
A+(Excellent)	9	80 – 84
A(Very Good)	8	75 – 79
B+(Good)	7	70 – 74
B(Above Average)	6	65 – 69
C(Average)	5	60 – 64
P(Pass)	4	50 – 59
F(Fail)	0	<50
Ab(Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination

Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$SGPA\ (S_i) = \Sigma(C_i \times G_i) / \Sigma C_i$

where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$CGPA = \Sigma(C_i \times S_i) / \Sigma C_i$

where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

8.0 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the Institute or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

9.0 TRANSITORY REGULATIONS

9.1 Discontinued, detained, or failed candidates are eligible for admission

to two earlier or equivalent subjects at a time as and when offered.

10. GENERAL

10.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers .

10.2 The academic regulation should be read as a whole for the purpose of any interpretation.

10.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council of the College is final.

10.4 The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Academic Council of the College/Affiliating University.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be

		allowed to appear for examinations of the remaining subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the othe subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Using objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidates also are debarred and

	incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be

		permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Academic Council of the College (or) affiliating University for further action towards suitable punishment.	

Malpractices identified by squad or special invigilators will entail punishment to the candidates as per the above guidelines..

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

M.TECH. (MACHINE DESIGN)

I Year I Semester (3 Subjects+2 Electives +2 Open Elective + 1 Lab)

S.No.	SUBJECT CODE	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D1501	Advanced Mechanical Engineering Design	3	-	3	30	70
2	R18D1502	Advanced Mechanics of Solids	3	-	3	30	70
3	R18D1503	Fatigue, Creep & Fracture Mechanics	3	-	3	30	70
4		**PROGRAM ELECTIVE-I**	3	-	3	30	70
	R18D1504	Advanced Finite Element Analysis					
	R18D1505	Analysis Gear Engineering					
	R18D1506	Theory of Elasticity & Plasticity					
5		**PROGRAM ELECTIVE-II**	3	-	3	30	70
	R18D1507	Advanced Mechanics of Composite Materials					
	R18D1508	Advanced Computer Aided Design					
	R18D1509	Applied Tribology					
6		**OPEN ELECTIVE –I**	3	-	3	30	70
7	R18D1581	Kinematics and Dynamics Lab	-	3	2	30	70
8		**Audit Course I**	2	-	-	50	-
	R18DHS55	Disaster Management					
		Total	**20**	**3**	**20**	**260**	**490**

OPEN ELECTIVE I			
Subject Code	**Subject Name**	**Subject Code**	**Subject Name**
R18DME51	Non-Conventional Energy Sources	R18DCS51	Scripting Languages
R18DME52	Industrial Safety	R18DAE51	Mathematical Modeling Techniques
R18DME53	Operations Research	R18DEC51	Embedded Systems Programming
R18DHS51	Business Analytics		

I Year II Semester (3 Subjects+2 Electives+1 Open Elective+ 1 Lab)

S.No.	SUBJECT CODE	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D1510	Advanced Mechanics of Machinery	3	-	3	30	70
2	R18D1511	Design Synthesis	3	-	3	30	70
3	R18D1512	Experimental Stress Analysis	3	-	3	30	70
4	 R18D1513 R18D1514 R18D1515	**PROGRAM ELECTIVE – III** Industrial Robotics Design Of Hydraulic And Pneumatic System Mechatronics	3	-	3	30	70
5	 R18D1516 R18D1517 R18D1518	**PROGRAM ELECTIVE- IV** Computer Integrated Manufacturing Concurrent Engineering Mechanical Vibrations	3	-	3	30	70
6		**OPEN ELECTIVE- II**	3	-	3	30	70
7	R18D1582	Computer Aided testing, Analysis and Modeling Lab	-	3	2	30	70
8	 R18DHS56	**Audit Course II** English for Research Paper Writing	2	-	-	50	
Total			**20**	**3**	**20**	**260**	**490**

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II			
Subject Code	Subject Name	Subject Code	Subject Name
R18DME54	Composite Materials	R18DCS52	Information Security
R18DME55	Waste to Energy	R18DAE52	Unmanned Aerial Vehicles
R18DME56	Industrial Management	R18DEC52	Research Methodology
R18DHS52	Cost Management of Engineering Projects		

II Year I Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D1583	Seminar-I	-	-	2	50	-
2	R18D1591	Mini Project	-	-	4	100	-
3	R18D1592	Project Review I	-	-	8	100	-
Total			**-**	**-**	**14**	**250**	**-**

II Year II Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max Marks	
						Int.	Ext.
1	R18D1584	Seminar-II	-	-	2	50	-
2	R18D1593	Project Review - II	-	-	8	100	-
3	R18D1594	Project Viva-Voce	-	-	8	-	100
Total			**-**	**-**	**18**	**150**	**100**

SEMESTER-I
SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

M .Tech I Year – I Sem(Machine Design)

L	T/P/D	C
3	0	3

(R18D1501) ADVANCED MECHANICAL ENGINEERING DESIGN

Course Objectives:

- Understanding the motion of the component and the basic geometry of the mechanisms.
- Understanding the process and methods of design of machines and elements.
- The kinematics of machines deals with the motion of members of the mechanisms which includes the determination of velocities and acceleration of the machine members.
- Abilities of developing equations pertaining to the design of machines.
- Ability to design new machines or modify existing machine according to the need.

UNIT-I

Design Philosophy: Design process, Problem formation, Introduction to product design, various design models-Shigley model, Asimov model and Norton model, Need analysis, Strength considerations -standardization. Creativity, Creative techniques, Material selections, Notches and stress concentration, design for safety and Reliability.

UNIT-II

Product Design: Product strategies, value, planning and specification, concept generation, concept selection, concept testing.

Design for manufacturing: Forging design, Casting design, Design process for non metallic parts, Plastics, Rubber, Ceramic, Wood and Glass parts like. Material selection in machine design.

UNIT-III

Failure Theories: Static failure theories, Distortion energy theory, Maximum shear stress theory, Coulomb-Mohr's theory, Modified Mohr's theory, Fracture mechanics theory, Fatigue mechanisms, Fatigue failure models, Design for fatigue strength and life, creep: Types of stress variation, design for fluctuating stresses, design for limited cycles, multiple stress cycles, Fatigue failure theories ,cumulative fatigue damage, thermal fatigue and shock, harmful and beneficial residual stresses, Yielding and transformation.

UNIT-IV

Surface Failures: Surface geometry, mating surfaces, oil film and their effects, design values and procedures, adhesive wear, abrasive wear, corrosion wear, surface fatigue, different contacts, dynamic contact stresses, surface fatigue failures, surface fatigue strength.

UNIT-V

Economic Factors Influencing Design: Economic analysis, Break-even analysis, Human engineering considerations, Ergonomics, Design of controls, Design of displays. Value engineering, Material and process selection in value engineering, Modern approaches in design.

TEXT BOOKS:

1 Machine Design An Integrated Approach / Robert L. Norton / Prentice-Hall New . Jersey, USA.
2 Engineering Design / George E Dieter / McGraw Hill /2008
3 Mechanical Engineering Design / J.E. Shigley and L.D. Mitchell / McGraw Hill . International Book Company, New Delhi.

REFERENCE BOOKS:

1 Fundamentals of machine elements/ Hamrock, Schmid and Jacobian/ 2nd edition . /McGraw-Hill International edition.
2 Product design and development / Karl T. Ulrich and Steven D. Eppinger / 3rd . edition/ Tata McGraw Hill.
3 Product Design and Manufacturing /A.K. Chitale and R.C. Gupta / Prentice Hall

Course Outcomes:

After Completion of this course students will be able to

- Apply the knowledge of Mathematics, Science and Engineering for designing machine part. Propose the Engineering solutions for global progress, productivity and economic development. List the materials and variety of mechanical components available/used to produce every day goods and services.
- Identify and solve the engineering challenges regarding the human needs in daily life about machines and systems. List the processes and methods of design of machines and elements. Develop equations and relations pertaining to the design of machines Develop fundamental knowledge of the Standards used in the design of machine elements. List different materials and state their properties
- Design component, machine, workstation and systems etc. for safe working by minimizing accidents and other health hazards. List and define functionality of various parts used in Automobiles, working principles and their design which include brakes, Gears, Clutches, and Springs etc.
- Design new machines or modify the existing machines according to the need, also use the techniques, skills and modern engineering tools for engineering practice. Communicate effectively through written and oral skills.
- Knowledge of different materials and their properties for designing the components of machine elements.

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M.Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1502) ADVANCED MECHANICS OF SOLIDS

Course Objectives:

- To understand the strain/displacement and Hooke's law relationships.
- To solve torsion problems in bars and thin walled members.
- To solve for stresses and deflections of beams under unsymmetrical loading.
- To impart concepts of stress and strain analyses in a solid.
- To study the methodologies in theory of elasticity at a basic level.

UNIT-I

Shear Centre: Bending axis and shear center-shear center for axi-symmetric and un symmetrical sections.

Unsymmetrical Bending: Bending stresses in Beams subjected to Nonsymmetrical bending Deflection of straight beams due to nonsymmetrical bending.

UNIT-II

Curved Beam Theory: Winkler Bach formula for circumferential stress – Limitations – Correction factors – Radial stress in curved beams – closed ring subjected to concentrated and uniform lads- stresses in chain links.

UNIT- III

Torsion: Torsion of a cylindrical bar of Circular cross Section, Saint-Venant's semi-inverse methods, Linear elastic solution Prandtl elastic membrane (Soap-Film) Analogy, Narrow rectangular cross Section , Hallow thin wall torsion members, Multiply connected Cross section, Thin wall torsion members with restrained ends

Axi-Symmetric Problems: Rotating Discs – Flat discs, Discs of uniform thickness, Discs of Uniform Strength, Rotating Cylinders.

UNIT-IV

Theory of Plates: Introduction, Stress resultants in a flat plate Kinematics Strain-Displacement relations for plates Equilibrium equations for small displacement theory of flat plates Stress – Strain, – Temperature relation for Isotropic plates, Strain energy of a plate, Boundary conditions for plate Solution of rectangular plate problem, Solution of circular plate problem.

Beams on Elastic Foundation: General theory, Infinite Beam subjected to concentrated load, boundary conditions, Infinite beam subjected to a distributed lad segment, Semi-infinite beam with concentrated load near its end, Short Beams.

UNIT-V

Contact Stresses: Introduction, problem of determining contact stresses, Assumptions on which a solution for contact stresses is based, Expressions for principal stresses, Methods of computing contact stresses, Deflection of bodies in point contact; Stresses for two bodies in contact over narrow rectangular area (Line contact), Loads normal to area; Stresses for two bodies in line contact. Normal and Tangent to contact area.

TEXT BOOKS:

1. Advanced Mechanics of materials/Seely and Smith/ John Willey
2. Advanced Mechanics of materials / Boresi & Sidebottom/wiely international
3. Advanced strength of materials / Den Hortog J.P./Torrent

REFERENCE BOOKS:

1. Strength of materials / Sadhu singh/ Khanna Publishers
2. Mechanics of Materials / Beer & Jhonson / McGraw Hill
3. Theory of Plates & Shells / Timoshenko/ McGraw Hill/ 2nd Edition

Course Outcomes:

After Completion of this course students will be able to

- Understand and analyze stresses and strains at a point.
- Analyze and determine beams under unsymmetrical loading.
- Apply shear center of thin wall beams, torsion & ax symmetric problems
- Design straight beams, curved and asymmetrical bending of beams.
- Apply energy methods in structural mechanics problems.

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L	T/P/D	C
3	0	3

(R18D1503) FATIGUE, CREEP AND FRACTURE MECHANICS

Course Objectives:

- Provide an understanding of the mechanics and micro-mechanisms of elastic and plastic deformation, creep, fracture, and fatigue failure, as applied to metals, ceramics, composites, thin film and biological materials.
- Provide a thorough introduction to the principles of fracture mechanics.
- Provide practical examples of the application of fracture mechanics to design and life prediction methods and reporting. Provide a basis for the use of fractography as a diagnostic tool for structural failures.
- To provide an understanding of fundamental principles and assumptions, and to give a basis for analysis and evaluation of structures from a fracture mechanics point of view.
- Also students will be explored to fatigue, creep deformation, creep-fatigue interactions.

UNIT-I

Introduction: Fracture behaviour of metals and alloys. The ductile/brittle transition temperatures for notched and un-notched components, Ductile rupture as a failure mechanism Fracture at elevated temperature.

Definitions of types of fracture and failure, Introduction to stress intensity factor and strain energy release rate, Equivalence of energy approach and stress intensity approach.

Basic Stress Analysis and Mechanical Properties: Elasticity, General 3-D relations, Plane stress and plane strain, Mohr's circle-principal stresses, Yield in materials, Tresca and Von Mises criteria, Ideal and actual strength of materials. Typical stress/strain curves for different classes of materials.

UNIT-II

Stress Intensity Factor and its use in Fracture Mechanics: Early concepts of stress concentrators and flaws, Ingles solution to stress round an elliptical hole-implications of results. Stress intensity factor for a crack. Westergaard's solution for crack tip stresses. Stresses and displacement in Cartesian and polar coordinates, Linear Elastic Fracture Mechanics. Typical values of fracture toughness, Different modes of crack opening. Superposition of crack tip stress fields, Direction of crack growth under mixed mode loadings.

Crack tip plasticity, Early estimates of plastics zone, Irwin plastic zone correction and Dugdale approach, Plastic zone shape in three dimensions and shape under plane stress and plane strain conditions, Allowable plasticity for LEFM to apply, the thickness criterion Experimental methods for measuring Kic.

UNIT-III

Elastic/Plastic Fracture Mechanics: Elastic/plastic fracture mechanics: The crack opening displacement and J-integral approaches, R-curve analysis Testing procedures, Measurement of these parameters, RAD, Fail sage and safe life design approaches, Practical applications. Advanced to pics in EOFM.

UNIT-IV

Fatigue: Importance of fatigue in engineering, Low cycle fatigue, Coffin-Manson law, Cyclic work hardening and softening. Micro structural models of crack initiation. Stage I, II and III crack growth.

Analysis of Fatigue: The empirical laws of fatigue failure. High cycle-low strain fatigue, Basquin's law, Goodman, Soderberg and Gerber mean stress corrections, Miner's law of damage summation. Low cycle fatigue, Crack growth and application of fracture mechanics to fatigue, Paris-Ergodan law, Threshold stress intensity range. Crack closure and its theories Cycle counting methods, Developments in using rain-flow counting methods to recreate fatigue standard spectra. Standard spectra suitable for different applications.

UNIT-V

Fatigue Of Welded Structures: Factors affecting the fatigue lives of welded joints, the codes and standards available to the designer, the use of fracture mechanics to supplement design rules. Practical examples.

Creep: Phenomenology, Creep curves, Creep properties, Multi-axial creep, Creep-fatigue interaction, Creep integrals.

TEXT BOOKS:

1. Mechanical Metallurgy / Dieter / McGraw Hill
2. Fracture Mechanics: Fundamental and Applications /Anderson T.L & Boca Raton/ . CRC Press, Florida, 1998.
3. Deformation and Fracture mechanics of Engineering Materials / Richard W Hertz . /Wiley

REFERENCE BOOKS:

1. Plasticity for structural Engineers / W.F. Chen and D.J,. Ha,
2. Engineering Fracture Mechanics/ D.R.J. Owen and A.J. Fawkes /Pincridge press, . Swansea, U.K.
3. Fracture and fatigue control in structures/ S.T. Rolfe and J.M. Barsom/ Printice Hall, Englewood cliffs, N.J..

Course Outcomes:

- The Student will be able to use simple continuum mechanics and elasticity to determine the stresses, strains, and displacements in a loaded structure. Able to do mathematical modeling of the elements of plastic deformation, with respect to continuum and microscopic mechanisms.
- The Student will be able to use creep data to predict the life of structures at elevated temperatures and the understanding of mechanisms of creep deformation and fracture.
- The Student will be able to quantitatively estimate failure criteria for both elastically and plastically deforming structures, in the design of life prediction strategies, and for fracture control plans, with examples from automotive, aerospace, medical, and other industries.

- After completion of this course students will acquire the knowledge for applying fracture mechanics theory
- To calculate stress areas and the"energy release rate" around crack tips and crack growth due to fatigue

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M .Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1504) ADVANCED FINITE ELEMENT ANALYSIS (PROGRAM ELECTIVE–I)

Course Objectives:

- Apply vector mechanics as a tool for problem solving.
- Understand the need in Design for the Finite Element Method.
- Understanding of mechanical engineering design concepts to use the Finite Element Method software correctly and efficiently.
- Analyze a physical problem, develop experimental procedures for accurately investigating the problem, and effectively perform and document findings.
- Understand forces associated with different parts of a machine

UNIT-I

Introduction to FEM, basic concepts, historical back ground, applications of FEM, general description, comparison of FEM with other methods, variational approach, Glerkin's Methods. Coordinates, basic element shapes, interpolation function, Virtual energy principle, Rayleigh – Ritz method, properties of stiffness matrix, treatment of boundary conditions, solution of system of equations, shape functions and characteristics, Basic equations of elasticity, strain- displacement relations.

UNIT-II

1-D Structural Problems: Axial bar element – stiffness matrix, load vector, temperature effects, Quadratic shape functions and problems. ANALYSIS OF TRUSSES : Plane Trusses and Space Truss elements and problems ANALYSIS OF BEAMS : EFA Hermite shape functions – stiffness matrix – Load vector – Problems.

UNIT-III

2-D Problems: CST, LST, force terms, Stiffness matrix and load vectors, boundary conditions, Isoparametric elements – quadrilateral element, shape functions – Numerical Integration. Finite element modelling of Axi-symmetric solids subjected to Axi-symmetric loading with triangular elements. 3-D PROBLEMS: Tetrahedran element – Jacobian matrix – Stiffness matrix.

UNIT-IV

Scalar Field Problems: 1-D Heat conduction-Slabs – fins - 2-D heat conduction problems – Introduction to Torsional problems.

UNIT-V

Dynamic Considerations: Dynamic equations – consistent mass matrix – Eigen Values, Eigen vector, natural frequencies – mode shapes – modal analysis.

TEXT BOOKS:

1. The Finite Element Methods in Engineering / SS Rao / Pergamon.
2. Finite Element Methods: Basic Concepts and applications, Alavala, PHI
3. Introduction to Finite Elements in Engineering, Chandrupatla, Ashok and Belegundu, Prentice – Hall

REFERENCE BOOKS:

1. Finite Element Method – Zienkiewicz / Mc Graw Hill
2. Introduction to Fininte element analysis- S.Md.Jalaludeen,Anuradha Publications, print-2012
3. A First Course in the Finite Element Method/Daryl L Logan/Cengage Learning/5th . Edition

Course Outcomes:

After Completion of this course students will be able to solve

- Numerical methods involved in Finite Element Theory.
- Definition of truss, beam, membrane, plate, and continuum elements. Formulation of planar one dimensional (truss and beam) elements having linear, quadratic, and cubic shape functions.
- Global, local, and natural coordinates. Formulation of planar, plane stress two-dimensional elements (rectangular and quadratic quadrilateral elements).
- Formulation of 3-dimensional elements (four node tetrahedral and eight-node brick elements).
- Direct formulation and basic energy and weighted residual formulation of finite elements. Procedures for performing and verifying FEA using commercial FEA software.

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M .Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1505) ANALYSIS GEAR ENGINEERING
(Design Data Book Permitted)
(PROGRAM ELECTIVE–I)

Course Objectives:

- To develop an ability to design a system, component, or process to meet desired needs with in realistic constraints.
- To develop an ability to identify, formulate, and solve engineering problems.
- To develop an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Impart design skills to the students to apply these skills for the problems in reallife industrial applications.
- Develop an holistic design approach to find out pragmatic solutions to realistic domestic and industrial problems.

UNIT–I

Introduction: Principles of gear tooth action, Generation of Cycloid and Involute gears, Involutometry, gear manufacturing process and Inspection, gear tooth failure modes, stresses, selection of right king of gears.

Spur Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of spur gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load. Design of gear shaft and bearings.

UNIT–II

Helical Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of helical gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load. Design of gear shaft and bearings.

Gear Failures: Analysis of gear tooth failures, Nomenclature of gear tooth wear and failure, tooth breakage, pitting, scoring, wear, overloading, gear-casing problems, lubrication failures.

UNIT–III

Worm Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of worm gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load. Heat dissipation consideration. Design of gear shaft and bearings.

UNIT–IV

Bevel Gears: Tooth loads, Principles of Geometry, Design considerations and methodology, Complete design of bevel gear teeth considering Lewis beam strength, Buckingham's dynamic load and wear load. Design of gear shaft and bearings.

UNIT–V

Gear Trains: Simple, compound and epicyclic gear trains, Ray diagrams, Design of a gearbox of an automobile, Design of gear trains from the propeller shafts of airplanes for auxiliary systems.

Optimal Gear Design: Optimization of gear design parameters. Weight minimization, Constrains in gear train design-space, interference, strength, dynamic considerations, rigidity etc. Compact design of gear trains, multi objective optimization of gear trains. Application of Traditional and non-traditional optimization techniques.

TEXT BOOKS:

1. Machine Design/ Maleev and Hartman/ C.B.S Publishers, India.
2. Gear engineering/ Henry E.Merrit / Wheeler publishing, Allahabad. 1992.
3. Practical Gear design/ Darle W.Dudley/ McGraw-Hill book company.

REFERENCE BOOKS:

1. Analytical mechanics of gears/ Earle Buckingham/ Dover publications, New York, . 1949.
2. Hand book of gear design/ G.M.Maitha / Tata McGraw Hill publishing company Ltd, . New Delhi, 1994.
3. Machine Design / Shaum series / McGraw Hill.

Course Outcomes:

After Completion of this course students will get

- Ability to select appropriate materials for a design, considering manufacturability, availability, cost, performance, suitability for the conditions, potential failure modes, environmental impact, and other considerations.
- Ability to evaluate the importance of an engineering decision, select an appropriate decision making process, and implement that process to make a defensible engineering decision.
- Ability to model, analyze, design, and realize a mechanical system that meets a particular need.
- To understand and apply principles of gear design to spur gears and industrial spur gear boxes.
- To become proficient in Design of Helical and Bevel Gear.

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M .Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1506) THEORY OF ELASTICITY AND PLASTICITY (PROGRAM ELECTIVE–I)

Course Objectives:

- To understand the theory of stress, strain and plasticity and enlighten the advances in plasticity and plastic strain analysis.
- To obtain the stress strain relation within the elastic body and find the principle stress and strain for a different types of elastic body.
- To known yield criteria for ductile metal.
- To understand the plastic stress-strain relations and learn Upper and lower bound theorems and corollaries.
- To understand the concepts of plasticity, yield criteria, plastic flow etc.,

UNIT-I

Elasticity: Two dimensional stress analysis - Plane stress - Plane strain - Equations of compatibility - Stress function - Boundary conditions.

Problem in Rectangular Coordinates - Solution by polynomials - Saint Venent's principles - Determination of displacement - Simple beam problems.

Problems in Polar Coordinates - General equations in polar coordinates - Stress distribution symmetrical about axis - Strain components in polar coordinates - Simple and symmetric problems.

UNIT-II

Analysis of Stress and Strain in Three Dimensions: Principle stresses - Homogeneous deformations - Strain spherical and deviatoric stress - Hydrostatic strain.

General Theorems: Differential equations of equilibrium and compatibility - Displacement - Uniqueness of solution - Reciprocal theorem.

UNIT-III

Bending of Prismatic Bars: Stress function - Bending of cantilever beam - Beam of rectangular cross-section - Beams of circular cross-section.

UNIT-IV

Plasticity: Plastic deformation of metals - Structure of metals - Deformation - Creep stress relaxation of deformation - Strain rate condition of constant maximum shear stress - Condition of constant strain energy - Approximate equation of plasticity.

UNIT-V

Methods of Solving Practical Problems: The characteristic method - Engineering method - Compression of metal under press - Theoretical and experimental data drawing.

TEXT BOOKS:

1. Theory of Elasticity/Timoshenko S.P. and Goodier J.N./Koakusha Publishers
2. An Engineering Theory of Plasticity/E.P. Unksov/Butterworths
3. Applied Elasticity/W.T. Wang/TMH

REFERENCE BOOKS:

1. Theory of Plasticity for Engineers/Hoffman and Sacks/TMH
2. Theory of Elasticity and Plasticity/Sadhu Singh/ Khanna Publishers
3. Theory of Elasticity and Plasticity/Harold Malcolm Westergaard/Harvard University . Press

Course Outcomes:

After Completion of this course students will be able to

- Understand the stress and strain tensor field.
- Understand the contact stresses analysis problem in bearing.
- Understand advanced concepts of plasticity and plastic deformation analysis
- Students can demonstrate Idealized stress-strain diagrams for different material models
- Demonstrate experimental verification of the Prandtl-Reuss equation.

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M .Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1507) ADVANCED MECHANICS OF COMPOSITE MATERIALS (PROGRAM ELECTIVE–II)

Course Objectives:

- To develop an understanding of the linear elastic analysis of composite materials.
- To understanding will include concepts such as anisotropic material behavior and the analysis of laminated plates.
- The students will undertake a design project involving application of fiber reinforced laminates.
- Explain the behavior of constituents in the composite materials.
- Enlighten the students in different types of reinforcement.

UNIT–I

Basic Concepts and Characteristics: Geometric and Physical definitions, natural and man-made composites, Aerospace and structural applications, types and classification of composites.

Reinforcements: Fibres – Glass, Silica, Kevlar, carbon, boron, silicon carbide, and born carbide fibres. Particulate composites, Polymer composites, Thermoplastics, Thermostats, Metal matrixand ceramic composites.

UNIT–II

Micromechanics: Unidirectional composites, constituent materials and properties, elastic properties of a lamina, properties of typical composite materials, laminate characteristics and configurations. Characterization of composite properties.

Manufacturing Methods: Autoclave, tape production, moulding methods, filament winding, manlayup, pultrusion, RTM.

UNIT–III

Coordinate Transformation: Hooke's law for different types of materials, Hooke's law for two dimensional unidirectional lamina, Transformation of stress and strain, Numerical examples of stress strain transformation, Graphic interpretation of stress – strain relations. Off –axis, stiffness modulus, off – axis compliance.

Elastic Behavior of Unidirectional Composites: Elastic constants of lamina, relation ship between engineering constants and reduced stiffness and compliances, analysis of laminated composites, constitutive relations.

UNIT–IV

Strength of Unidirectional Lamina: Micro mechanics of failure, Failure mechanisms, strength of an orthotropic lamina, strength of a lamina under tension and shear maximum stress and strain criteria, application to design. The failure envelope, first ply failure, free-edge effects. Micros mechanical predictions of elastic constants.

UNIT–V

Analysis of Laminated Composite Plates:

Introduction thin plate theory, specially orthotropic plate, cross and angle ply laminated plates, problems using thin plate theory.

TEXT BOOKS:

1. Mechanics of Composite Materials/ R. M. Jones/ Mc Graw Hill Company, New York,1975.
2. Engineering Mechanics of Composite Materials by Isaac and M Daniel, Oxford University Press,1994.
3. Analysis and performance of fibre Composites/ B. D. Agarwal and L. J. Broutman/ Wiley Interscience, New York, 1980.

REFERENCE BOOKS:

1. Mechanics of Composite Materials/ Second Edition (Mechanical Engineering)/ Autar K.Kaw Publisher: CRC
2. Analysis of Laminated Composite Structures/ L. R. Calcote/ Van Nostrand Rainfold, NewYork, 1969.
3. Advanced Mechanics of Composite Materials/ Vasiliev &Morozov/Elsevier/Second Edition

Course Outcomes:

- An ability to identify the properties of fiber and matrix materials used in commercial composites, as well as some common manufacturing techniques.
- An ability to predict the elastic properties of both long and short fiber composites based on the constituent properties.
- An ability to rotate stress, strain and stiffness tensors using ideas from matrix algebra.
- A basic understanding of linear elasticity with emphasis on the difference between isotropic and anisotropic material behavior.
- An ability to analyze a laminated plate in bending, including finding laminate properties from lamina properties and find residual stresses from curing and moisture.

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M .Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1508) ADVANCED COMPUTER AIDED DESIGN (PROGRAM ELECTIVE–II)

Course Objectives:

- Model the 3-D geometric information of machine components including assemblies, and automatically generate 2-D production drawings.
- Understand the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program.
- Improve visualization ability of machine components and assemblies before their actual fabrication through modeling, animation, shading, rendering, lighting and coloring. Model complex shapes including freeform curves and surfaces.
- Integrate the CAD system and the CAM system by using the CAD system for modeling design Information and converting the CAD model into a CAM model for modeling the manufacturing Information.
- Use full-scale CAD/CAM software systems designed for geometric modeling of machine Components and automatic generation of manufacturing information.

UNIT-I

Principles of Computer Graphics : Introduction, graphic primitives, point plotting, lines, Bresenham's circle algorithm, ellipse, transformation in graphics, coordinate systems, view port,2D and 3D transformation, hidden surface removal, reflection, shading and generation of characters.

UNIT-II

Cad Tools: Definition of CAD Tools, Types of system, CAD/CAM system evaluation criteria, brief treatment of input and output devices. Graphics standard, functional areas ofCAD, Modeling and viewing, software documentation, efficient use of CAD software.

Geometric Modelling: Types of mathematical representation of curves, wire frame models wire frame entities parametric representation of synthetic curves her mite cubic splines Beziercurves B-splines rational curves.

UNIT-III

Surface Modeling: Mathematical: representation surfaces, Surface model, Surface entities surface representation, Parametric representation of surfaces, plane surface, rule surface, surface of revolution, Tabulated Cylinder.

UNIT-IV

Parametric Representation of Synthetic Surfaces: Hermite Bicubic surface, **Bezier** surface, **B-** Spline surface, COONs surface, Blending surface Sculptured surface, Surface manipulation — Displaying, Segmentation, Trimming, Intersection, Transformations (both 2D and 3D).

UNIT-V

Geometricmodelling-3D: Solid modeling, Solid Representation, Boundary Representation (13-rep), Constructive Solid Geometry (CSG).**CAD/CAM.**

Exchange : Evaluation of data - exchange format, IGES data representations and structure, STEP Architecture, implementation, ACIS & DXF. Design Applications: Mechanical tolerances, Mass property calculations, Finite Element Modeling and Analysis and Mechanical Assembly.

Collaborative Engineering: Collaborative Design, Principles, Approaches, Tools, Design Systems.

TEXT BOOKS:

1. Mastering CAD/CAM / Ibrhim Zeid / Mc Graw Hill International.
2. CAD/CAM Principles and Applications/ P.N.Rao/TMH/3rd Edition
3. CAD/CAM /Groover M.P./ Pearson education

REFERENCE BOOKS:

1. CAD/CAM Concepts and Applications/ Alavala/ PHI
2. CAD / CAM / CIM, Radhakrishnan and Subramanian/ New Age
3. Principles of Computer Aided Design and Manufacturing/ Farid Amirouche/ Pearson

Course Outcomes:

After Completion of this course students will be able to

- Understand the concepts of wireframe, surface and solid modeling and part modeling and part data exchange standards (VDA, IGES, and STEP).
- Develop knowledge in 2D-Transformations, 3D Transformations and the Assembly Modeling, Assembly tree, and Assembly Methods.
- The Students become experts on Visualization and computer animation Techniques.
- Identify and interpret information provided in technical drawings, schematics, or mask sets.
- Analyze relationships between design elements for parametric modeling.

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M .Tech I Year – I Sem (Machine Design)

L	T/P/D	C
3	0	3

(R18D1509) APPLIED TRIBOLOGY
(PROGRAM ELECTIVE-II)

Course Objectives:

- Understanding the principles for selecting compatible materials for minimizing friction and wear in machinery and the principles of bearing selection and bearing arrangement in machines.
- Learn the computations required for selecting and designing bearings in machines and the fundamental principles of lubrication for reduction of friction and Wear.
- Understanding the fundamental principles of high contact stresses (Hertz stresses), Fatigue-failure and Elasto hydrodynamic (EHD) lubrication in rolling bearings and gears.
- Describe the viscosity and laws of fluid flow with reference to lubrication.
- Illustrate the behavior of tribological components subjected to different working conditions and describe different tribological measures

UNIT-I

Historical Background - Viscosity - Viscometry - Effect of temperature on viscosity - Effect of pressure in viscosity - Other physical properties of mineral oils - The generalized Reynolds equation - Flow and shear stress - The energy equation - The equation of state - Mechanism of pressure development.

UNIT-II

Circumferential Flow - Oil flow through a bearing having a circumferential oil groove - Heat generation and lubricant temperature - Heat balance and effective temperature - Bearing design: Practical considerations - Design of journal bearings - Parallel surface bearing - Step bearing - Some situations under squeeze film lubrication - The mechanism of hydrodynamic instability - Stiffness and damping coefficients - Stability.

UNIT-III

Elasto Hydrodynamic Lubrication: Theoretical consideration - Grubin type solution - Accurate solution - Point contact - Dimensionless parameters - Film thickness equations - Different regimes in EHL contact - Deep-groove radial bearings - Angular contact bearings - Thrust ball bearings - Geometry - Kinematics - Stress and deformations - Load capacity.

UNIT-IV

Surface Topography - Surface characterization - Apparent and real area of contact - Derivation of average Reynolds equation for partially lubricated surface - Effect of surface roughness on journal bearings

UNIT-V

Laws of Friction - Friction theories - Surface contaminants - Frictional heating - Effect of sliding speed on friction - Classification of wear - Mechanisms of wear - Quantitative laws of wear - Wear resistance materials.

TEXT BOOKS:

1. Rowe WW& O' Dionoghue, Hydrostatic and Hybrid bearing design — Butterworths . & Co.Publishers Ltd,1983.
2. Collacott R.A, Mechanical Fault diagnosis and condition monitoring , Chapman and Hall, London 1977.
3. Bernard J.Hamrock, — Fundamentals of fluid film lubricant , Mc Graw-Hill Co.,1994.

REFERENCE BOOKS:

1. Neale MJ, (Editor) — Tribology hand Book Neumann Butterworths, 1975.
2. Connor and Boyd JJO (Editors) — Standard hand book of lubrication engineers — . ASLE,Mc
3. Introduction to Tribology of Bearings by Majumdar, B.C

Course Outcomes:

- Students will demonstrate basic understanding of friction, lubrication and wear processes and familiar with mathematical tools used to analyze tribological processes.
- Students will become familiar with common anti-friction and anti-wear components and the lubricants used therein.
- Students will be able to describe the detailed operation of selected anti-friction or anti wear components.
- The student can identify different areas of Industrial Tribology.
- Can find the applications of all the areas in day to day life.

OPEN ELECTIVE-I

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(R18DME51) NON CONVENTIONAL ENERGY SOURCES (OPEN ELECTIVE-I)

Course Objectives:

- To explain the concept of various forms of renewable energy.
- To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications.
- This course envisages the new and renewable source of energy, available in nature.
- To expose the students on sources of energy crisis and the alternates available.
- Also stress up on the application of non-conventional energy technologies.

UNIT-I

Introduction: Energy Scenario, Survey of energy resources. Classification and need for conventional energy resources.

Solar Energy: The Sun-sun-Earth relationship, Basic matter to waste heat energy circuit, Solar Radiation, Attention, Radiation measuring instruments.

Solar Energy Applications: Solar water heating. Space heating, Active and passive heating, Energy storage, Selective surface, Solar stills and ponds, solar refrigeration, Photovoltaic generation.

UNIT -II

Geothermal Energy: Structure of earth, Geothermal Regions, Hot springs. Hot Rocks, Hot Aquifers. Analytical methods to estimate thermal potential. Harnessing techniques, Electricity generating systems.

UNIT-III

Direct Energy Conversion: Nuclear Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic, Thermionic and Thermoelectric generation and MHD generator.

Hydrogen Gas as Fuel: Production methods, Properties, I.C. Engines applications, Utilization strategy, Performances.

UNIT-IV

Bioenergy: Biomass energy sources. Plant productivity, Biomass wastes, aerobic and anaerobic bioconversion processes, Raw material and properties of bio-gas, Bio-gas plant technology and status, the energetic and economics of biomass systems, Biomass gasification

UNIT-V

Wind Energy: Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types, Betz model. Interference factor. Power coefficient, Torque coefficient and Thrust coefficient, Lift machines and Drag machines. Matching Electricity generation.

Energy from Oceans: Tidal energy, Tides, Diurnal and semi-diurnal nature, Power from tides, Wave Energy, Waves, Theoretical energy available. Calculation of period and phase velocity of waves, Wave power systems, submerged devices. Ocean thermal Energy, Principles, Heat

exchangers, Pumping requirements, Practical considerations.

TEXTBOOKS:

1. Non-conventional Energy Sources / GD Rai/Khanna publications.
2. Non-Conventional Energy Sources and Utilisation (Energy Engineering)/ R K Rajput / S.Chand.
3. Renewable Energy Sources /Twidell & Weir/Taylor and Francis/ 2nd special Indian edition .

REFERENCE BOOKS:

3. Renewable Energy Resources- Basic Principles and Applications/ G.N.Tiwari and M.K.Ghosal/ Narosa Publications.
4. Renewable Energy Resources/ John Twidell & Tony Weir/Taylor & Francis/2nd edition.
5. Non Conventional Energy / K.Mittal/ Wheeler.

Course Outcomes:

- Students get expertise in analyzing the environmental sources.
- Cost economics of using renewable energy sources compared to fossil fuel. Students get exposure on direct energy conversion systems.
- Understand the different non conventional sources and the power generation techniques to generate electrical.
- Design a prescribed engineering sub-system.
- Recognize the need and ability to engage in lifelong learning for further developments in this field.

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(R18DME52) INDUSTRIAL SAFETY
(OPEN ELECTIVE –I)

Course Objectives:

- To explain the concept of various industrial safety methods.
- To outline division aspects measurements of safety performance .
- To know about Industrial safety programs and toxicology, Industrial laws , regulations and source models.
- To understand about fire and explosion, preventive methods, relief and its sizing methods.
- To analyse industrial hazards and its risk assessment.

UNIT-I :
Importance of Safety, health and environment. Health safety and environmental policy, fundamentals of safety, classification of accidents, Managements responsibility, objectives of safety management, National safety council, Employees state insurance act 1948, approaches to prevent accidents, principles of safety management, safety organization, safety auditing, maintenance of safety, measurements of safety performance, industrial noise and noise control, Industrial Psychology, Industrial accidents and prevention. Introduction to OSHAS 18001 AND OSHA.

UNIT II:
Process safety management (P.S.M) as per OSHA, legal aspects of safety, safety with respect to plant and machinery, the explosive act 1884, Petroleum act 1934, personal protective equipment, classification of hazards, protection of respiratory system, work permit system, hazards in refineries and process plants, safety in process plants, pollution in some typical process industry.

UNIT III:
Safe working practices, housekeeping, safe working environment, safety device and tools, precaution in use of ladders, safety instruction during crane operation, safety instruction for welding, burning and cutting and gas welding equipment, electrical safety, case studies, safety in use of electricity, electric shock phenomena, Occurrence of electric shock, medical analysis of electric shock and its effect, safety procedures in electric plants, installation of Earthing system,

UNIT IV:
Safety in hazardous area, hazard in industrial zones, classification of industrial Enclosures for gases and vapors. Mechanical, Chemical, Environmental and Radiation hazards, Machine guards and safety devices, slings, load limits, lifting tackles and lifting equipment,

hydrostatic test, Chemical hazards, industrial toxicology, toxic chemicals and its harmful effects on humans, factors influencing the effect of toxic materials, Units of concentration, control measure, environmental hazards, devices for measuring radiation, safety analysis and risk analysis, risk management, First aid, Safety measures to avoid occupational diseases.

UNIT V

Factories act – 1948 Stuatutory authorities – inspecting staff, health, safety, provisions relating to hazardous processes,welfare, working hours, employment of young persons – special provisions – penalties and procedures- Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules – electricity act and rules

Text books :

1. Industrial safety management By: L.M. Deshmukh Publishers: Tata Megraw Hill ,New Delhi Year: 2006 Edition: First
2. The Factories Act 1948, Madras Book Agency, Chennai, 2000

References:

1. Industrial safety health and environment Management system By: R.K. Jain & Sunil S. Rao Publishers: Khanna Publishers Year: 2008 Edition: Second
2..The Indian boilers act 1923, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.
3.. ”Accident prevention manual for industrial operations”, N.S.C.,Chicago, 1982.
4. Industrial Safety and Environment by Amit Gupta
5.“Safety in Industry” N.V. Krishnan JaicoPublishery House, 1996.

Course Outcome:

By the end of the course the students will be able to.

- Analyze the effect of release of toxic substances.
- Understand the industrial laws, regulations and source models.
- Apply the methods of prevention of fire and explosions.
- Understand the relief and its sizing methods.
- Understand the methods of hazard identification and preventive measures.

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(R18DME53)OPERATIONS RESEARCH
(OPEN ELECTIVE –I)

Course Objectives:

- To familiarize the students with the use of practice oriented mathematical applications for optimization functions in an organization.
- To familiarize the students with various tools of optimization, probability, statistics and simulation,
- To applicable in particular scenarios in industry for better management of various resources.
- Analyze any real life system with limited constraints and depict it in a model form.
- Convert the problem into a mathematical model.

UNIT–I

Introduction : Development – Definition– Characteristics and Phases – Types of models – operation Research models– applications.

Allocation : Linear Programming Problem Formulation – Graphical solution – Simplex method –Artificial variables techniques -Two–phase method, Big-M method.

UNIT–II

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem –Degeneracy.Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

Sequencing – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

UNIT–III

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

Theory of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT–IV

Waiting Lines: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

UNIT–V

Dynamic Programming: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Simulation Languages.

TEXT BOOKS :

1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Hiller &Libermann (TMH).
3. Introduction to O.R /Taha/PHI

REFERENCE BOOKS:

1. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson . Education.
2. Operations Research / R.Pannerselvam,PHI Publications.
3. Operation Research /J.K.Sharma/MacMilan.

Course Outcomes:

- Student will be able to Illustrate the need to optimally utilize the resources in various types of industries.
- Apply and analyze mathematical optimization functions to various applications.
- Demonstrate cost effective strategies in various applications in industry.
- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.

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(R18DHS51) BUSINESS ANALYTICS
(OPEN ELECTIVE –I)

Course Objective:

- To understand the importance of ever-increasing volume, variety and velocity of data in organization and application of data analytical tools for decision making.
- Students will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities and aspire to add value to society.
- Students will effectively communicate using business specific terminology in written and verbal form.
- Students will utilize interpersonal and leadership skills to be highly effective business managers and leaders.
- Students will have a strategic understanding of business analytics.

Unit-I: Introduction to Business Analytics: Importance, Scope, Evolution, Classification, and Application; Data Structure-Visualization of Data, Data Architecture, Measurement Scale; Decision Models-Classification, Structure of Decision Models; Data Structure and Data View-Understanding of data, exploring data using pivot tables.

Unit-II: Descriptive Analytics: Descriptive Statistical Measures–Population and samples, Measures of location, Measures of Dispersion, Measures of variability, measures of Association. Probability distribution and Data Modeling – Discrete Probability distribution, Continuous Probability distribution, Random sampling from Probability Distribution, Data Modeling and Distribution fitting.

Unit-III: Predictive Analytics: Karl Pearson Correlation Techniques -Multiple Correlation-Spearman's Rank correlation-Simple and Multiple regression-Regression by the method of least squares –Building good regression models –Regression with categorical independent variables --Linear Discriminant Analysis-One way and Two Way ANOVA

Unit-IV: Data Mining: Scope of Data Mining, Data Exploration and Reduction, Unsupervised learning –cluster analysis, Association rules, Supervised learning-Partition Data, Classification Accuracy, prediction Accuracy, k-nearest neighbors, Classification and regression trees, Logistics Regression.

Unit-V: Simulation: Random Number Generation, Monte Carlo Simulation, What if Analysis, Verification and Validation, Advantages and Disadvantages of Simulation, Risk Analysis, Decision Tree Analysis.

References:

- James Evans, Business Analytics, 2e, Pearson.

- Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney, Williams Essential of Business Analytics, Cengage Learning.
- Thomas Eri, Wajid Khattack & Paul Buhler: Big Data Fundamentals, Concepts, drivers and Techniques by Prentice Hall of India, New Delhi.
- Akil Maheswari: Big Data, Upskill ahead by Tata McGraw Hill, New Delhi.
- Seema Acharya & Subhashini Chellappan: Big Data and Analytics, Wiley Publications, New Delhi.
- S. Christian Albright, Wayne L. Winston: Business Analytics: Data Analysis & Decision Making, Cengage Learning

Course Outcome:

- Students will be able to understand Importance of Analytics.
- Students will be able to understand Understanding the analytical tools.
- Students will be able to understand Application of Analytical tools to solve business problems.
- Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.
- Analyze and evaluate appropriate business strategies, practices, and theories that inform and guide organizations to ensure sustainability.

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(R18DCS51) SCRIPTING LANGUAGES
(OPEN ELECTIVE – I)

Course Objectives:

- Motivation for and applications of scripting.
- Difference between scripting languages and non- scripting languages.
- Types of scripting languages.
- Scripting languages such as PERL, PHP,TCL/TK, python and BASH.
- Creation of programs in the Linux environment.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance perl - finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming Php and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web

Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

Course Outcomes:

- Ability to create and run scripts using PERL/TCl/Python/PHP in IC design flow.
- Be familiar with design issues of object-oriented and functional languages.
- Be familiar with language abstraction constructs of classes, interfaces, packages, and procedures.
- Be familiar with using functional languages.
- Ability to use Linux environment and write programs for automation of scripts in VLSI tool design flow.

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(R18DAE51) MATHEMATICAL MODELING TECHNIQUES
(OPEN ELECTIVE-I)

Course Objectives

- The objective is to emphasize the importance of mathematical modeling of diverse engineering problems.
- Specifically aerospace problems will be discoursed to understand the need for numerical techniques
- To introduce optimization techniques into numerical problems to reduce problem data.
- Identify a problem and choose an appropriate mathematical model.
- Solve the problem using the appropriate technology if necessary.

UNIT-I: **INTRODUCTION TO MODELING AND SINGULAR PERTURBATION METHODS**

Definition of a model, Procedure of modeling: problem identification, model formulation, reduction, analysis, Computation, model validation, Choosing the model, Singular Perturbations: Elementary boundary layer theory, Matched asymptotic expansions, Inner layers, nonlinear oscillations

UNIT-II: **VARIATIONAL PRINCIPLES AND RANDOM SYSTEMS**

Variational calculus: Euler's equation, Integrals and missing variables, Constraints and Lagrange multipliers, Variational problems: Optics-Fermat's principle, Analytical mechanics: Hamilton's principle, Symmetry: Noether's theorem, Rigid body motion, Random systems: Random variables, Stochastic processes, Monte Carlo method

UNIT-III: **FINITE DIFFERENCES: ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS**

ODE: Numerical approximations, Runge-Kutta methods, Beyond Runge-Kutta, PDE: Hyperbolic equations-waves, Parabolic equations-diffusion, Elliptic equations-boundary values

CELLULAR AUTOMATA AND LATTICE GASES

Lattice gases and fluids, Cellular automata and computing

UNIT- IV: **FUNCTION FITTING AND TRANSFORMS**

Function fitting: Model estimation, Least squares, Linear least squares: Singular value decomposition, Non-linear least squares: Levenberg-Marquardt method, Estimation, Fisher information, and Cramer-Rao inequality, Transforms:Orthogonal transforms, Fourier transforms, Wavelets, Principal components

FUNCTION FITTING ARCHITECTURES

Polynomials: Pade approximants, Splines, Orthogonal functions, Radial basis functions, Over-fitting, Neural networks: Back propagation, Regularization

UNIT-V: **OPTIMIZATION AND SEARCH**
Multidimensional search, Local minima, Simulated annealing, Genetic algorithms
FILTERING AND STATE ESTIMATION

Matched filters, Wiener filters, Kalman filters, Non-linearity and entrainment, Hidden Markov models

TEXT BOOK

1. *The Nature of Mathematical Modeling*, Neil Gershenfeld, Cambridge University Press, 2006, ISBN 0-521-57095-6

REFERENCE BOOKS

2. *Mathematical Models in the Applied Sciences*, A. C. Fowler, Cambridge University Press, 1997, ISBN 0-521-46140-5

3. *A First Course in Mathematical Modeling*, F. R. Giordano, M.D. Weir and W.P. Fox, 2003, Thomson, Brooks/Cole Publishers

Applied Numerical Modeling for Engineers, Donald De Cogan, Anne De Cogan, Oxford University Press, 1997

Course Outcomes

- Student will be able to predict and develop a numerical framework to a problem of physical interest.
- Student will be able to choose different techniques to solve various problems of diverse engineering, more especially to aeronautics and aerospace.
- Student will also enable to choose better optimized solutions using different optimization techniques.
- Students will develop understanding of various mathematical concepts and modeling techniques required for successful application of mathematics.
- Student will be able to model data using the language and techniques of mathematics.

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(R18DEC51) EMBEDDED SYSTEMS PROGRAMMING (OPEN ELECTIVE –I)

Course Objectives:

- To have knowledge about the basic programming of an embedded system.
- To provide in-depth knowledge about embedded processor, its hardware and software.
- To explain real time operating systems, inter-task communication and an embedded software development tool.
- To acquire knowledge about embedded processors and their applications.
- Test a real application of Embedded system on Board

Unit 1 - Embedded OS (Linux) Internals

Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication - Semaphore, Pipes, FIFO, Shared Memory

Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling.

Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network

Unit 2 – Open source RTOS

Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Matric in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS.

Unit 3 – Open Source RTOS Issues

POSIX standards, RTOS Issues - Selecting a Real Time Operating System, RTOS comparative study. Converting a normal Linux kernel to real time kernel, Xenomai basics.

Overview of Open source RTOS for Embedded systems (Free RTOS/ Chibios-RT) and application development.

Unit 4 – VxWorks / Free RTOS

VxWorks/ Free RTOS Scheduling and Task Management - Realtime scheduling, Task Creation, Intertask Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems - General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral

Unit 5 – Case study

Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board ().Testing a real time application on the board

TEXT BOOKS:

1. Essential Linux Device Drivers, Venkateswaran Sreekrishnan
2. Writing Linux Device Drivers: A Guide with Exercises, J. Cooperstein
3. Real Time Concepts for Embedded Systems – Qing Li, Elsevier

REFERENCES:

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill
2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK
3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17the IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society
4. Real-time Systems – Jane Liu, PH 2000
5. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A
6. Structured Development for Real - Time Systems V1 : Introduction and Tools: Ward, Paul T & Mellor, Stephen J
7. Structured Development for Real - Time Systems V2 : Essential Modeling Techniques: Ward, Paul T & Mellor, Stephen J
8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J
9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H
10. Embedded Software Primer: Simon, David E.
11. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

Course Outcomes:

- Ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
- Ability to port an Embedded OS/ RTOS to a target board.
- Foster ability to understand the design concept of embedded systems.
- Ability to integrate hardware and software for embedded applications systems.
- Foster ability to understand the design concept of embedded systems.

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(R18D1581) KINEMATICS AND DYNAMICS LABORATORY

Course Objectives:

- To equip students with understanding of the fundamental principles and techniques for Identify different types of dynamic systems and classify them by their governing equations.
- To develop a model of a mechanical system using a free body diagram.
- To develop equations of motion for translational and rotational mechanical systems.
- To develop an understanding of how property data is generated and reported.
- To create a bridge between theoretical knowledge and application.

LIST OF EXPERIMENTS:

1. Determination of damped natural frequency of vibration of the vibrating system with different viscous oils.
2. Determination of steady state amplitude of a forced vibratory system.
3. Static balancing using steel balls.
4. Determination of the magnitude and orientation of the balancing mass in dynamic balancing.
5. Field balancing of the thin rotors using vibration pickups.
6. Determination of the magnitude of gyroscopic couple, angular velocity of precession and representation of vectors.
7. Determination of natural frequency of given structure using FFT analyzer.
8. Diagnosis of a machine using FFT analyzer.
9. Study of un damped natural frequencies
10. Study of frequencies with various springs arranged in series and parallel

(A Minimum of 10 experiments are to be conducted)

Course Outcomes:

As an outcome of completing this course, students will be able to:

- Plan, conduct, analyze and evaluate experiments.
- Compare analytical and theoretical results.
- Understand static and dynamic balance.
- Understand forward and inverse kinematics of open-loop mechanisms.
- Communicate test results through presentation (graphical or oral).

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(R18DHS55) Disaster Management
(Audit Course I)

Course objective:

- Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
- Understand the four work objectives of the disaster manager.
- They Know the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful.
- To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
- To ensure skills and ability to design, implement and evaluate research on disasters.

Unit-I: **Introduction to Disaster Management:** Definition, Nature, Types and Magnitude. Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters

Unit-II: Consequences of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Pre-Disaster Management- Early Warning and Prediction Systems: Role of IT, RS, GIS, GPS and ICS

Unit-III: **Global Perspective (Natural Disasters):** History of Disasters And Types of Hazards: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides & Avalanches.

Unit-IV: Global Perspective (Man-Made Disasters): Study of Environmental Impacts Induced By Human Activity, Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

Unit-V: Disaster Management and Planning: Post Disaster Management Planning: Management of Essential Supplies and Temporary Shelter Relief, Evacuation & other Logistic Management, Site Management, Medical Trauma and Stress Management, Integrated Developmental Planning For Disaster Management

Reference Books:

- Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
- Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
- Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
- Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
- Government of India, 1997, Vulnerability Atlas of India, New Delhi.

- Sahni, Pardeep Et.Al. (Eds.) 2002, Disaster Mitigation Experiences and Reflections. Prentice Hall Of India, New Delhi.

Course Outcomes:

- Students will be able to affirm the usefulness of integrating management principles in disaster mitigation work.
- Students can distinguish between the different approaches needed to manage pre-during and post- disaster periods.
- Understanding foundations of hazards, disasters and associated natural/social phenomena.
- Familiarity with disaster management theory (cycle, phases).
- Capacity to manage the Public Health aspects of the disasters.

SEMESTER-II
SYLLABUS

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L	T/P/D	C
3	0	3

(R18D1510) ADVANCED MECHANICS OF MACHINERY

Course Objectives

- Understand the basic principles and concepts of Mechanical Design.
- To study the physics that governs behavior of various mechanisms.
- Examine the suitability of mechanical devices/products for specific applications.
- Understand the various quantitative and qualitative approaches to synthesis and modeling of compliant mechanisms.
- To understand the synthesis and path generation of four bar mechanism.

UNIT–I

Advanced Kinematics of Plane Motion- I: Introduction to plane motion. The Inflection circle, Euler – Savary Equation, Analytical and graphical determination of di , Bobillier's Construction , Collineation axis , Hartmann's Construction ,Inflection circle for the relative motion of two moving planes, Application of the Inflection circle to kinematic analysis.

UNIT-II

Advanced Kinematics of Plane Motion - II: Polode curvature, Hall's Equation, Polode curvature in the four bar mechanism, coupler motion, relative motion of the output and input links, Determination of the output angular acceleration and its Rate of change, Freudenstein's collineation –axis theorem, Carter –Hall circle, The circling – point curve for the Coupler of afour bar mechanism.

UNIT-III

Introduction to Synthesis-Graphical Methods - I: The Four bar linkage ,Guiding a body through Two distinct positions, Guiding a body through Three distinct positions, The Roto center triangle , Guiding a body through Four distinct positions, Burmester's curve.

UNIT-IV

Introduction to Synthesis-Graphical Methods - II: Function generation- General discussion, Function generation: Relative – Roto center method, Overlay's method, Function generation- Velocity – pole method, Path generation: Hrones's and Nelson's motion Atlas, Roberts's theorem.

UNIT–V

Introduction to Synthesis - Analytical Methods: function generation: Freudenstien's equation, Precision point approximation, Precision – derivative approximation, Path Generation: Synthesis of Four-bar Mechanisms for specified instantaneous condition, Method of components, Synthesis of Four-bar Mechanisms for prescribed extreme values of the angular velocity of driven link, Method of components.

TEXT BOOKS:

1. Kinematics and Dynamics of plane mechanisms/ Jeremy Hirschhorn/McGraw-. Hill,1962.
2. Theory of Machines and Mechanisms/ J.E Shigley and J.J . Uicker Jr./ McGraw-Hill, . 1995
3. Theory of Mechanisms and Machines/ Amitabh Ghosh and Ashok Kumar Mallik/

E.W.P.Publishers.

REFERENCE BOOKS:

1. Kinematics and Linkage Design/ Allen S.Hall Jr./ PHI,1964.
2. Kinematics and Dynamics of Machinery/Charles E Wilson/Pearson/3rd Edition
3. Mechanics of Machines by Viswanatha Ramamurti

Course Outcomes

- Understand the metrics that are used to determine/set desired performance.
- Understand the physics that govern the behavior of compliant mechanisms.
- Identify the practical issues that are important to address during integration and implementation.
- Able to understand function and path generation of mechanisms.
- Students are able to understand the graphical and analytical methods for four bar mechanism.

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(R18D1511) DESIGN SYNTHESIS

Course Objective:

- To study the set of tools and methods for product design and development.
- To understand the tolerance and surface finish Confidence to create a new product.
- The role of multiple functions in creating a new product (e.g. marketing, finance, industrial design, engineering, production).
- Ability to coordinate multiple, interdisciplinary tasks in order to achieve a common objective.
- To study the design optimization in the new product development.

UNIT-I

Design process and methodologies of systematic design conceptual design variants and evaluation Standardization and its exploitation in design.

UNIT–II

Tolerance from process and function, interchangeability and selective assembly, selection of fits for different design situations, surface finish. Load transmission, load equalization light weigh and rigid constructions.

UNIT–III

Design of case, forged sheet metal parts and welded constructions Machine considerations.

UNIT–IV

Design for assembly and dismantling Modular constructions erection, operation inspection and maintenance considerations, Ergonomics Design of accuracy Location pins and registers, Machining in assembly, adjustment, Backlash and Clearance adjustment.

UNIT–V

Problems formulation for design optimization Example illustration the various principles available design variants for some of the common basic functional requirements.

TEXT BOOKS:

1. Engineering Design a systematic approach/ G. Phal W. Beitz/ Springer /3rd Edition
2. Engineering Design a material and processing approach/ George Dieter/ McGraw . Hi8ll international book company 1983
3. Engineering Design Synthesis: Understanding, Approaches and Tools edited by . Amaresh Chakrabarti.

REFERENCE BOOKS:

1. Mechanical Design Theory Methodology/ Manjula B. Waldron and Kenneth J. Waldron/Springer Verlag New York 1996.
2. Design Synthesis: Integrated Product and Manufacturing System Design Graeme Arthur Britton, Seppo Torvinen.
3. Formal Engineering Design Synthesis By Erik K. Antonsson, California Institute of . Technology & Jonathan Cagan , Carnegie Mellon University, Pennsylvania.

Course Outcomes:

Students are able to understand a product design are,

- Know how to communicate product design ideas and concepts.
- Able to develop product design proposals
- Able to realize outcomes to a design brief.
- Understand design principles and ergonomic accuracies for product development.
- Able form design optimization for various functional requirements.

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(R18D1512) EXPERIMENTAL STRESS ANALYSIS

Course Objectives:

- To study the relation between the mechanics theory and experimental stress analysis.
- To establish the fundamental concepts and new experimental techniques.
- To use the experimental techniques on the practical problems.
- To make a fine presentation related to the experimental techniques.
- To study conceptual techniques of 3D photo elasticity and birefringent coatings.

UNIT-I

Introduction: Theory of Elasticity, Plane stress and plane strain conditions, compatibility conditions, three-dimensional stress strain relations.

Strain Measurement Methods: various types of strain gauges, electrical resistance strain gauges, semiconductor strain gauge circuits.

UNIT-II

Recording Instruments: Introduction, static recording and data logging, dynamic recording at very low frequencies, dynamic recording at intermediate frequencies, dynamic recording at high frequencies, dynamic recording at very high frequencies, telemetry systems.

UNIT-III

Brittle Coatings: Introduction, coating stresses, failure theories, brittle coating crack patterns, crack detection, ceramic based brittle coatings, resin based brittle coatings, test procedures for brittle coatings analysis, analysis of brittle coating data.

Moire Methods: Introduction, mechanism of formation of Moire fringes, the geometrical approach to moiré-fringe analysis, the displacement field approach to Moire-fringe analysis, out of plane displacement measurements, out of plane slope measurements, sharpening and multiplication of moiré-fringes, experimental procedure and techniques.

UNIT-IV

Photo Elasticity: Photo elasticity, polariscope, plane and circularly polarized light, bright and dark filed setup, photo elasticity materials,, Isochromatic fringes – Isoclinics.

UNIT-V

Three Dimensional Photo Elasticity: Introduction, locking in model deformation, materials for three dimensional photo elasticity, machining cementing and slicing three dimensional models, slicing the model and interpretation of the resulting fringe patterns, effective stresses, shear-difference method in three dimensions, scattered-light method

Birefringent Coating: Introduction, coating stress and stains, coating sensitivity, coating materials, application of coatings, effective of coating thickness, fringe-order determinations in coatings, stress separation methods.

TEXT BOOKS:

1. Theory of elasticity / Timoshenko and Goodier Jr.
2. Experimental Stress analysis/ Dally and Riley, Mc Graw-Hill
3. Experimental Stress Analysis by James W. Dally, William Franklin Riley

REFERENCE BOOKS:

1. A treatise on Mathematical theory of elasticity / LOVE A.H./ Dover Publications
2. Photo Elasticity / Frocht/ Wiley / 3rd Edition
3. Experimental Stress Analysis: Principles and Methods By G. S. Holister

Course Outcomes:

After Completion of this course students will be able to,

- Apply basic science systematization thought excavation, the evaluation, the diagnosis project question, and plans and carries out ability of the special study and the solution.
- Have independent research, collection the data, standard problem take into analytical the identification and acquire conclusion.
- Able to use mathematical engineering realm is related analysis and design software, explanation data with independently solves the ability of problem.
- Able to understand the methods of photo elasticity.
- Ability to use 3D photo elasticity methods and birefringent coating for different materials.

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(R18D1513) INDUSTRIAL ROBOTICS
(PROGRAM ELECTIVE – III)

Course Objectives:

- To develop the student's knowledge in various robot structures and their workspace.
- To develop student's skills in perform kinematics analysis of robot systems.
- To provide the student with some knowledge and analysis skills associated with Trajectory planning.
- To provide the student with some knowledge and skills associated with robot controls
- To know the industrial applications of robots.

UNIT-I

Introduction: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation work volume, robot drive system, control system and dynamic performance, precision of movement.

Control System and Components: basic concept and modais controllers control systematic analysis, robot activation and feedback components. Positions sensors, velocity sensors, actuators sensors, power transmission system.

UNIT-II

Motion Analysis and Control: Manipulator kinematics, position representation forward transformation, homogeneous transformation, manipulator path control, robot dynamics, configuration of robot controller.

UNIT-III

End Effectors: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics.

Machine Vision: Functions, Sensing and Digitizing-imaging, Devices, Lighting techniques, Analog to digital single conversion, image storage, Image processing and Analysis-image data reduction, Segmentation feature extraction. Object recognition, training the vision system, Robotics application.

UNIT-IV

Robot Programming: Lead through programming, Robot programming as a path in space ,Motion interpolation, WAIT, SINONAL AND DELAY commands, Branching capabilities and Limitations.

Robot Languages: Textual robot Languages, Generation, Robot language structures, Elements in function.

UNIT-V

Robot Cell desgin and control: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detect ion, Work wheel controller.

Robot Application: Material transfer, Machine loading/unloading. Processing operation, Assembly and Inspection, Feature Application.

TEXT BOOKS:

1. Industrial Robotics / Groover M P /Pearson Edu.
2. ntroduction to Robotic Mechanics and Control / J J Craig/ Pearson / 3rd edition.
3. Robotics / Fu K S/ McGraw Hill.

REFERENCE BOOKS:

1. Robotic Engineering / Richard D. Klafter, Prentice Hall
2. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.
3. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.

Course Outcomes:

After Completion of this course students will be able to

- Classify robots based on joints and arm configurations.
- Design and applications of specific End Effectors for robots.
- Compute forward and inverse kinematics of robots and determine trajectory plan.
- Program robot to perform typical tasks including Pick and Place, Stacking and Welding.
- Design and select of robots for Industrial applications.

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(R18D1514) DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS (PROGRAM ELECTIVE – III)

Course Objective:

- To again the knowledge hydraulic power generators and selection and specifications of pumps
- Impart students on the science, use and application of hydraulics and pneumatics as fluid power in Industry.
- Also to impart knowledge on the methodology of basic and advanced design of pneumatics and hydraulics systems.
- To understand pneumatic systems and circuits
- To know about Electrical control of pneumatic and Hydraulic circuits.

UNIT I OIL HYDRAULIC SYSTEMS AND HYDRAULIC ACTUATORS

Hydraulic Power Generators – Selection and specification of pumps, pump characteristics. Linear and Rotary Actuators – selection, specification and characteristics, Hydrostatic drives, types, selection.

UNIT II CONTROL AND REGULATION ELEMENTS

Pressure - direction and flow control valves - relief valves, non-return and safety valves - actuation systems, Proportional Electro hydraulic servo valves.

UNIT III HYDRAULIC CIRCUITS

Reciprocation, quick return, sequencing, synchronizing circuits - accumulator circuits - industrial circuits - press circuits - hydraulic milling machine - grinding, planning, copying, - forklift, earth mover circuits design methodology- design and selection of components - safety and emergency mandrels – Cascade method.

UNIT IV PNEUMATIC SYSTEMS AND CIRCUITS

Pneumatic fundamentals - control elements, position and pressure sensing, Pneumatic equipments- selection of components - design calculations - logic circuits - switching circuits - fringe conditions modules and these integration - sequential circuits - cascade methods - mapping methods - step counter method - compound circuit design - combination circuit design- Karnaugh - Veitch map.

UNIT V ELECTROMAGNETIC & ELECTRONIC CONTROL OF HYDRAULIC & PNEUMATIC CIRCUIT

Electrical control of pneumatic circuits – use of relays, counters, timers, ladder diagrams, use of microprocessor in circuit design – use of PLC in hydraulic and pneumatic circuits – Fault finding– application -fault finding - hydro pneumatic circuits - use of microprocessors for sequencing - PLC, Low cost automation - Robotic circuits.

REFERENCES:

1. Antony Espossito, “Fluid Power with Applications”, Prentice Hall, 1980.

2. Dudleyt, A. Pease and John J. Pippenger, “Basic fluid power”, Prentice Hall, 1987.

3. Andrew Parr, “Hydraulic and Pneumatics” (HB), Jaico Publishing House, 1999.

4. Bolton. W., “Pneumatic and Hydraulic Systems “, Butterworth –Heinemann, 1997.

5. K.Shanmuga Sundaram, “Hydraulic and Pneumatic Controls: Understanding made Easy" S.Chand & Co Book publishers, New Delhi, 2006 (Reprint 2009)

Course Outcome:

- Hydraulic power generators and selection and specifications of pumps and know about actuators.
- Use and application of hydraulics and pneumatics as fluid power in Industries.
- Also to impart knowledge on the methodology of basic and advanced design of pneumatics and hydraulics systems.
- To understand pneumatic systems and circuits
- To again knowledge about Electrical control of pneumatic and Hydraulic circuits.

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(R18D1515) MECHATRONICS
(PROGRAM ELECTIVE – III)

Course Objectives:

- Have a strong foundation in science and focus in mechanical, electronics, control, software, and computer engineering, and a solid command of the newest technologies
- Be able to design, analyze, and test "intelligent" products and processes that incorporate Appropriate computing tools sensors, and actuators
- Be able to demonstrate professional interaction and communicate effectively with team Members Be able to work efficiently in multidisciplinary teams
- Be prepared for a variety of engineering careers, graduate studies, and continuing education
- Practice professional and ethical responsibility, and, be aware of the impact of their designs on human-kind and the environment.

UNIT-I

Mechatronics systems, elements, levels of Mechatronics system, Mechatronics design process, system, measurement systems, control systems, microprocessor-based controllers, advantages and disadvantages of Mechatronics systems. Sensors and transducers, types, displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT-II

Solid state electronic devices, PN junction diode, BJT, FET, DIA and TRIAC. Analog signal conditioning, amplifiers, filtering. Introduction to MEMS & typical applications.

UNIT-III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems: Mechanical actuating systems and electrical actuating systems.

UNIT-IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT-V

System and interfacing and data acquisition, DAQS, SCADA, A to D and D to A conversions; Dynamic models and analogies, System response. Design of Mechatronics systems & future trends.

TEXT BOOKS:

1. MECHATRONICS Integrated Mechanical Electronics Systems/KP Ramachandran & GK Vijaya Raghavan/WILEY India Edition/2008

2. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
3. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.

REFERENCE BOOKS:

1. Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.
2. Mechatronics System Design / Devdas shetty/Richard/Thomson.
3. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

Course Outcomes:

Mechatronics engineering graduates will be able to:

- Employ the knowledge of mathematics, science, and engineering. Design and conduct experiments to evaluate the performance of a Mechatronics system or component with respect to specifications, as well as to analyze and interpret data.
- Design Mechatronics component, system or process to meet desired needs
- Define and solve engineering problems. Use the techniques, skills, and modern Mechatronics engineering tools necessary for engineering practice.
- Communicate technical matters effectively in oral, written, and graphical form
- Identify and evaluate ethical ramifications and professional responsibilities in a variety of situations.

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(R18D1516) COMPUTER INTEGRATED MANUFACTURING
(PROGRAM ELECTIVE – IV)

Course objectives:

The students will learn to:

- Explain basic concepts of CIM systems and Develop machining programs for CNC equipment
- Develop PLC-based control systems for manufacturing cells
- Design CIM systems to fulfill certain requirements
- Identify and solve problems in the operations of CIM systems
- Enhance performance of manufacturing systems by applying different CIM concepts and tools

UNIT-I

Introduction: Scope of computer integrated manufacturing, Product cycle, Production automation.

Group technology: Role of group technology in CAD/CAM integration, Methods for developing part families, Classification and coding, Examples of coding systems, Facility design using group technology, Economics of group technology.

UNIT-II

Computer Aided Process Planning: Approaches to process planning - Manual, Variant, Generative approach, Process planning systems - CAPP, DCLASS, CMPP, Criteria for selecting a CAPP system, Part feature recognition, Artificial intelligence in process planning.

UNIT-III

Integrative Manufacturing Planning And Control: Role of integrative manufacturing in CAD/CAM integration, Over view of production control - Forecasting, Master production schedule, Capacity planning, M.R.P., Order release, Shop-floor control, Quality assurance, Planning and control systems, Cellular manufacturing, JIT manufacturing philosophy.

UNIT-IV

Computer Aided Quality Control: Terminology in quality control, Contact inspection methods,

Noncontact inspection methods, Computer aided testing, Integration of CAQC with AD/CAM.

UNIT-V

Computer Integrated Manufacturing Systems: Types of manufacturing systems, Machine tools and related equipment, Material handling systems, Computer control systems, FMS.

TEXT BOOKS:

1. CAD/CAM Principles and Applications by P.N. Rao, Tata McGraw Hill .Publishing. Company Ltd.
2. CAD/CAM Computer Aided Design and Manufacturing by Mikell P. Groover . and Emory W. Zimmer, Jr.
3. Computer Integrated Design and Manufacturing by David D. Bedworth, . Mark R. . Henderson, Philip M. Wolfe.

REFERENCE BOOKS:

1 Automation, Production Systems and Computer Integrated Manufacturing .by Mikell P. Groover, Prentice Hall of India Pvt. Ltd.
2 Principles of Computer Integrated Manufacturing by Vajapayee, Prentice . Hall of India Pvt. Ltd.
3 Computer Integrated Manufacturing By A. Alavudeen, N. Venkateshwaran.

Course Outcomes:

This course primarily contributes to Mechanical Engineering program outcomes:

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- An ability to identify, formulate, and solve engineering problems
- knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

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(R18D1517) CONCURRENT ENGINEERING
(PROGRAM ELECTIVE - IV)

Course objectives:

- To familiarize with the basics of concurrent engineering
- The tools and methodologies available in concurrent engineering
- Various approaches to concurrent engineering
- The other related aspects of concurrent engineering
- Critically analyses alternative spacecraft design configuration and option concurrent engineering identify information requirements and sources for spacecraft design and evaluation CE

UNIT-I

Introduction: Background and challenges faced by modern production environment, sequential engineering process, Concurrent engineering definition and requirement, meaning of concurrent objectives of CE, benefits of CE, Life cycle design of products, life cycle costs. Support for CE: Classes of support for CE activity, CE organizational, structure CE, team composition and duties, Computer based Support, CE Implementation Process.

UNIT-II

Design Product for Customer: Industrial Design, Quality Function Deployment, house of quality, Translation process of quality function deployment (QFD). Modeling of Concurrent Engineering Design: Compatibility approach, Compatibility index, implementation of the Compatibility model, integrating the compatibility Concerns.

UNIT-III

Design for Manufacture (DFM): Introduction, role of DFM in CE, DFM methods, e.g. value engineering, DFM guidelines, design for assembly, creative design methods, product family themes, design axioms, Taguchi design methods, Computer based approach to DFM. Evaluation of manufacturability and assimilability.

UNIT-IV

Quality by Design : Quality engineering & methodology for robust product design,Parameter and Tolerance design, Quality loss function and signal to noise ratio for designing the quality, experimental approach.

UNIT-V

Design for X-ability: Design for reliability, life cycle serviceability design, design for maintainability, design for economics, and decomposition in concurrent design, concurrent design case studies.

TEXT BOOKS:

1. Concurrent Engineering- Kusiak - John Wiley & Sons
2. Concurrent Engineering- Menon - Chapman & Hall
3. Concurrent Engineering Fundamentals; Integrated Product Development, VO1. I and II, Biren Prasad, Prentice Hall, New Jersey

REFERENCE BOOKS:

1. Concurrent Engineering /Johan R Hartley/productivity press.
2. Concurrent Engineering; concepts, Implementation and practice/chanan&Menon/ Chapman Hall
3. Concurrent Engineering by Susan Carlson Skalak

Course Outcomes:

- The graduates shall have the ability to understand the importance of product design in leveraging both manufacturing cost and product lifecycle cost.
- The graduates shall have the ability to plan and implement a product development program.
- The graduates shall have the ability to determine customer needs and define product specifications that meet professional ethical standards.
- The graduates shall have the ability to define product architecture and design products for maximum economic impact.
- The graduates shall have the ability to design and conduct experiments to ensure that the product design is robust and compatible with the capability of the manufacturing process.

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(R18D1518) MECHANICAL VIBRATIONS
(PROGRAM ELECTIVE – IV)

Course Objectives:

- To know about damped and undamped free vibrations
- Students will be able to learn how to deal with the phenomena of vibrations by transforming the physical model into a mathematical model.
- Getting the response of a physical model
- Solving the mathematical model, analyzing the response and bring its physical concept.
- To know about the numerical methods

UNIT-I

Single Degree of Freedom Systems : Undamped and damped free vibrations; forced vibrations coulomb damping, Response to excitation, rotating unbalance and support excitation, vibration isolation and transmissibility- Response to Non Periodic Excitations: unit impulse, unit step and unit Ramp functions; response to arbitrary excitations, The Convolution Integral, shock spectrum, System response by the Laplace Transformation method.

UNIT-II

Two Degree Freedom Systems: Principal modes- undamped and damped free and forced vibrations, undamped vibration absorbers.

UNIT-III

Multi Degree Freedom Systems: Matrix formulation, stiffness and flexibility influence coefficients, Eigen value problem; normal modes and their properties, Free and forced vibration by Modal analysis, Method of matrix inversion, Torsional vibrations of multi- rotor systems and geared systems, Discrete- Time systems.

Vibration Measuring Instruments: Vibrometers, velocity meters & accelerometers.

UNIT-IV

Frequency Domain Vibration Analysis: Over view, machine-train monitoringparameters-Data base development-vibration data acquisition-trending analysis-failure- nodeanalysis-signature analysis-root cause analysis.

UNIT-V

Numerical Methods: Raleigh's stodola's, Matrix iteration, Rayleigh- Ritz Method and Holzer's methods.

TEXT BOOKS:

1. Mechanical Vibrations/Groover/Nem Chand and Bros
2. Elements of Vibration Analysis by Meirovitch, TMH, 2001
3. Mechanical Vibrations/Schaum Series/ McGraw Hill

REFERENCE BOOKS:

1. Mechanical Vibrations / SS Rao/ Pearson/ 2009, Ed 4,
2. Mechanical Vibrations/Debabrata Nag/Wiley
3. Vibration problems in Engineering / S.P. Timoshenko.

Course Outcomes:

After Completion of this course students will be able to

- Understand the causes and effects of vibration in mechanical systems and their Classification.
- Solve vibration problems that contain multiple degrees of freedom and obtain design parameters.
- Learn how the vibration measuring instrument works and how to apply the proper instrument for a particular application.
- Analyze a system with infinite degrees of freedom and also be able to find infinite natural frequencies corresponding to infinite principle modes of the systems.
- Apply various numerical methods to solve determinants of higher order when one deals with multi-degree freedom systems

OPEN ELECTIVE-II

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(R18DME54) COMPOSITE MATERIALS
(OPEN ELECTIVE-II)

Course Objectives:

- To be familiar with classification and characteristics of composite material and their applications.
- To gain the knowledge about manufacturing methods of composites.
- To know the testing methods related to composite materials.
- To know the Advantages and disadvantages of Composite Materials.
- To again knowledge about Typical bond strengths and test procedures.

UNIT-I

Introduction: Definitions, Composites, Reinforcements and matrices, Types of reinforcements, Types of matrices, Types of composites, Carbon Fibre composites, Properties of composites in comparison with standard materials, Applications of metal, ceramic and polymer matrix composites.

UNIT-II

Manufacturing methods: Hand and spray lay - up, injection molding, resin injection, filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.

UNIT-III

Mechanical Properties -Stiffness and Strength: Geometrical aspects – volume and weight fraction. Unidirectional continuous fibre, discontinuous fibers, Short fiber systems, woven reinforcements –Mechanical Testing: Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.

UNIT-IV

Laminates: Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Plate Stiffness and Compliance, Computation of Stresses, Types of Laminates -, Symmetric Laminates, Anti-symmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Cross-ply Laminate, Angle-ply Laminate. Orthotropic Laminate, Laminate Moduli, Hygrothermal Stresses.

UNIT-V

Joining Methods and Failure Theories : Joining –Advantages and disadvantages of adhesive and mechanically fastened joints. Typical bond strengths and test procedures.

TEXT BOOKS:

1. K.K. Chawla, (1998), Composite Materials, Springer-Verlag, New York
2. B.T. Astrom, (1997), Manufacturing of Polymer Composites, Chapman & Hall

3. Composite materials by J.N.Reddy

REFERENCE BOOKS:

1. Stuart M Lee, J. Ian Gray, Miltz, (1989), Reference Book for Composites Technology, CRC press
2. Frank L Matthews and R D Rawlings, (2006), Composite Materials: Engineering and Science, Taylor and Francis.
3. D. Hull and T.W. Clyne, (1996), Introduction to Composite Materials, Cambridge University Press
4. Analysis and Performance of Fiber Composites by Bhagwan D. Agarwal
5. Mechanics of Composite Materials by Autar K. Kaw

Course Outcomes:

- To provide knowledge on characteristics of composites
- To get knowledge on manufacturing and testing methods and mechanical behavior of composites.
- Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear
- To get the exposure of different materials.
- To understand about Joining Methods and Failure Theories

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(R18DME55) WASTE TO ENERGY
(OPEN ELECTIVE-II)

Prerequisite: Renewable Energy Sources, Physics, Environmental Studies

Course Objectives:

- To classify solid waste sources
- To identify methods of solid waste disposal
- To study various energy generation methods
- To analyse biogas production methods and recycling of e-waste
- To know about Government regulations on e-waste management – International experience.

UNIT- I :Solid Waste Sources Solid Waste Sources, types, composition, Properties, Global warming, Municipal Solid Waste: Physical, chemical and biological properties , Waste Collection and, Transfer stations, Waste minimization and recycling of municipal waste, Segregation of waste, Size Reduction , Managing Waste. Status of technologies for generation of Energy from Waste Treatment and Disposal Aerobic composting, incineration, Furnace type and design, Medical waste /Pharmaceutical waste treatment Technologies, incineration, Environmental impacts, Measures to mitigate environmental effects due to incineration .

UNIT – II :Land Fill method of Solid waste disposal Land fill classification, Types, methods and Sitting consideration, Layout and preliminary design of landfills: Composition, characteristics, generation, Movement and control of landfill leach ate and gases, Environmental monitoring system for land fill gases.

UNIT – III :Energy Generation from Waste Bio-chemical Conversion: Sources of energy generation, anaerobic digestion of sewage and municipal wastes, direct combustion of MSW-refuse derived solid fuel, Industrial waste, agro residues, Anaerobic Digestion.

UNIT – IV :Biogas production, Land fill gas generation and utilization, Thermo-chemical conversion: Sources of energy generation, Gasification of waste using Gasifiers, Briquetting, Utilization and advantages of briquetting, Environmental benefits of Bio-chemical and Thermo- chemical conversion.

UNIT – V :E-waste: e-waste in the global context – Growth of Electrical and Electronics Industry in India – Environmental concerns and health hazards – Recycling e-waste: a thriving economy of the unorganized sector – Global trade in hazardous waste – impact of hazardous e-waste in India. Management of e-waste: e-waste legislation, Government

regulations on e-waste management – International experience – need for stringent health safeguards and environmental protection laws of India.

TEXT BOOKS:

1. Nicholas P. Cheremisinoff. Handbook of Solid Waste Management and Waste Minimization Technologies. An Imprint of Elsevier, New Delhi (2003).
2. P. Aarne Vesilind, William A. Worrell and Debra R. Reinhart. Solid Waste Engineering. Thomson Asia Pte Ltd. Singapore (2002)
3. M. Dutta , B. P. Parida, B. K. Guha and T. R. Surkrishnan. Industrial Solid Waste Management and Landfilling practice. Narosa Publishing House, New Delhi (1999).
4. "E-waste in India: Research unit, Rajya Sabha Secretariat, New Delhi, June 2011"
5. Amalendu Bagchi. Design, construction and Monitoring of Landfills. John Wiley and Sons. New York. (1994)
6. M. L. Davis and D. A. Cornwell. Introduction to environmental engineering. Mc Graw Hill International Edition, Singapore (2008)
7. C. S. Rao. Environmental Pollution Control Engineering. Wiley Eastern Ltd. New Delhi (1995)
8. S. K. Agarwal. Industrial Environment Assessment and Strategy. APH Publishing Corporation. New Delhi (!996)
9. Sofer, Samir S. (ed.), Zaborsky, R. (ed.), "Biomass Conversion Processes for Energy and Fuels", New York, Plenum Press, 1981
10. Hagerty, D.Joseph; Pavoni, Joseph L; Heer, John E., "Solid Waste Management", New York, Van Nostrand, 1973
11. George Tchobanoglous, Hilary Theisen and Samuel Vigil Prsl: Tchobanoglous, George Theisen, Hillary Vigil, Samuel, "Integrated Solid Waste management: Engineering Principles and Management issues", New York, McGraw Hill, 1993.

REFERENCES:

- C Parker and T Roberts (Ed), Energy from Waste – An Evaluation of Conversion Technologies, Elsevier Applied Science, London, 1985
- KL Shah, Basics of Solid and Hazardous Waste Management Technology, Prentice Hall, 2000 3. M Datta, Waste Disposal in Engineered Landfills, Narosa Publishing House, 1997
- G Rich et.al, Hazardous Waste Management Technology, Podvan Publishers, 1987
- AD Bhide, BB Sundaresan, Solid Waste Management in Developing Countries, INSDOC, New Delhi,1983 FUEL CELL AND

Google books:

1. e-waste Management: From waste to Resource Klaus Hieronymi, Ramzy Kahnat, Eric williams Tech. & Engg.-2013(Publisher: Earthscan 2013).
2. What is the impact of E-waste: Tamara Thompson
3. E-waste poses a Health Hazard: Sairudeen Pattazhy

Weblinks :

- www.unep.org
- www.routledge.com
- www.amazon.com
- www.bookdepository.com
- www.ecoactiv.com

Course Outcomes: Upon the completion of the subject, the student will be able to

- Understand technologies for generation of energy from solid waste
- Compare methods of solid waste disposal
- Identify sources of energy from bio-chemical conversion
- Analyze methods for management of e-waste
- Understand the Global trade in hazardous waste – impact of hazardous e-waste in India.

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L	T/P/D	C
3	0	3

(R18DME56) INDUSTRIAL MANAGEMENT
(OPEN ELECTIVE-II)

Course Objectives:

- Concepts of Management and Organization - Functions
- The student able to understand and make decisions relating to issues
- To understand about Organizational structure, production operations and marketing
- The student learns about Human resource Management, product management and strategy.
- To know about Inspection and quality control, types of inspections

UNIT- I

Concepts of Management and Organisation - Functions of Management - Evolution of Management Thought : Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc-Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Hertzberg's Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs - Systems Approach to Management.

UNIT –II

Designing Organisational Structures : Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT –III

Plant location, definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant- Matrix approach. Plant Layout - definition, objectives, types of production, types of plant layout - various data analyzing forms-travel chart.

Work study - Definition, objectives, method study - definition, objectives, steps involved-various types of associated charts-difference between micromotion and memomotion studies. Work measurement- definition,time study, steps involved-equipment, different methods of performance rating- allowances, standard time calculation. Work Sampling - definition, steps involved, standard time calculations, differences with time study.

UNIT –IV

Materials Management-Objectives, Inventory - functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems-Continuous review system-periodical review system. Stores Management and Stores Records. Purchase management, duties of purchase of manager,associated forms.Introduction to PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times

estimation-programme evaluation review techniques- Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT –V

Inspection and quality control, types of inspections - Statistical Quality Control-techniques-variables and attributes-assignable and non assignable causes- variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Introduction to TQM-Quality Circles, ISO 9000 series procedures. Introduction to Human Resource Management, Functions of HRM, Job Evaluation, different types of evaluation methods. Job description, Merit Rating.-difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs selling, marketing mix, product life cycle.

TEXT BOOKS:

1. Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition, 2004.
2. Industrial Engineering and Management O.P. Khanna Dhanpat Rai.
3. A.R.Aryasri, Management Science , Tata McGraw-Hill, 2002.

REFERENCE BOOKS:

1. Panner Selvam, Production and Operations Management, PHI, 2004.
2. Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy, Reliability Engineering & Quality Engineering, Galgotia Publications, Pvt., Limited.
3. Phillip Kotler, Marketing Management, Pearson, 2004.

Course Outcomes:

- Plan an organizational structure for a given context in the organization carry out
- Production operations through Work study and carry out production operations through Work study.
- Understand the markets, customers and competition better and price the given
- Products appropriately and ensure quality for a given product or service
- Plan and control the HR function better and plan schedule Control projects through PERT and CPM, evolve a strategy for a business or service organization.

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(R18DHS52) COST MANAGEMENT OF ENGINEERING PROJECTS (OPEN ELECTIVE – II)

Course Objective:

- Project Cost management is concerned with the process of planning and controlling the budget of a project or business.
- The Cost Management course addresses activities such as planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.
- To make them understand the concepts of Project Management for planning to execution of projects.
- To make them understand the feasibility analysis in Project Management and network analysis tools for cost and time estimation.
- To enable them to comprehend the fundamentals of Contract Administration, Costing and Budgeting.Make them capable to analyze, apply and appreciate contemporary project management tools and methodologies in Indian context.

Unit-I: Introduction to Project Cost Management: Concept of project cost management - objectives and scope- Elements of project costs: functional classification and ascertainment of cost (material, labour and overhead costs) –Preparation of a cost sheet for an engineering project

Unit-II: Method of Project Costing: Single Output/ Unit Costing: Activity Based Costing - Job Costing - Batch Costing - Contract Costing - Process/ Operation Costing

Unit-III: Marginal Cost: Marginal Costing – Nature and Scope- Applications - Break even charts and Point, Decision Making (all types with full problems) Differential Cost Analysis, Advantages and Disadvantages of Marginal Costing.

Unit-IV: Project Budgetary Control: Objectives of Project Budgetary control - Functional Project Budgets - Master Budgets - Key Factor Problems on Production Budgets and Flexible Budgets. Standard Costing- Comparison with Budgetary control, analysis of Variances, Simple Problems on Material and Labour variances only.

Unit-V: Project Cost Audit & Reporting to Management: Objectives and advantages of Project Cost Audit – Project Cost Audit report - Management Audit - Objectives and Scope. Reporting to Management – Purpose of reporting- Requisites of a good report, Classifications of Report, Segment reporting

Reference Books

- Project Estimating and Cost Management, Project Management Essential Library, Berrett-Koehler Publishers (October 1, 2001)

- Project Management Accounting,: Budgeting, Tracking, and Reporting Costs and Profitability, Wiley; 2 edition (June 28, 2011) by Kevin R. Callahan, Gary S. Stetz , Lynne M. Brooks
- Cost and Management Accounting 2014, by S.P. Jain & K.L. Narang
- Cost and Management Accounting, New Age International by M.E. Thukaram Rao
- Advanced Cost & Management Accounting – Problems & Solutions, Prentice Hall of India (P) Ltd. by V.K. Saxena & C.D. Vashist
- Studies in Cost Management, Sultan Chand & Sons by S.N. Maheshwari

Course Outcome:

- The student is able to understand the detailed cost concepts, cost structure and elements of costs of manufacturing and service organizations. Understand project characteristics and various stages of a project.
- Understand the conceptual clarity about project organization and feasibility analyses.
- Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.
- Apply the risk management plan and analyse the role of stakeholders. Understand basics of strategic sourcing process & its application.
- Understand the contract management, Project Procurement, Service level Agreements and productivity.

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L	T/P/D	C
3	0	3

(R18DCS52) INFORMATION SECURITY
(OPEN ELECTIVE – II)

Course Objectives:

- The student is able to understand the detailed cost concepts, cost structure and elements of costs of manufacturing and service organizations. Understand project characteristics and various stages of a project.
- Understand the conceptual clarity about project organization and feasibility analyses.
- Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.
- Apply the risk management plan and analyse the role of stakeholders. Understand basics of strategic sourcing process & its application.
- Understand the contract management, Project Procurement, Service level Agreements and productivity.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security

audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

Course Outcomes:

- To the enhancements made to lPv4 by IPSec. Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- To understand about Web security and Firewalls and Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

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L	T/P/D	C
3	0	3

(R18DAE52) UNMANNED AERIAL VEHICLES
(OPEN ELECTIVE – II)

Course Objectives:

- Acquire the knowledge of various disciplines contributing to the design, development and deployment of UAVs
- Explain the design of UAV systems and their configuration
- Develop and deploy the unmanned aircraft systems
- To understand the Development and Future of UAV Systems
- To know about the future applications of unmanned aircraft systems (UAV)

UNIT-I: INTRODUCTION TO UNMANNED AIRCRAFT SYSTEMS

Applications of UAS, categories of UAV systems, roles of unmanned aircraft, composition of UAV system.

UNIT-II: DESIGN OF UAV SYSTEMS-I

Introduction to design and selection of the systems-conceptual phase, preliminary design, detailed design; Aerodynamics and airframe configurations-Lift-induced Drag, Parasitic Drag, Rotary-wing Aerodynamics, Response to Air Turbulence, Airframe Configurations; Medium-range, Tactical Aircraft, Characteristics of Aircraft Types-Long-endurance, Long-range Role Aircraft, Medium-range, Tactical Aircraft, Close-range/Battlefield Aircraft, MUAV Types, MAV and NAV Types, UCAV, Novel Hybrid Aircraft Configurations, Aspects of Airframe Design: Scale Effects, Packaging Density, Aerodynamics, Structures and Mechanisms, Selection of power- plants, Modular Construction, Ancillary Equipment, Design for Stealth: Acoustic Signature, Visual Signature, Thermal Signature, Radio/Radar Signature, Payload Types: Non-dispensable and dispensablepayloads.

UNIT-III: DESIGN OF UAV SYSTEMS-II

Communications-Communication Media, Radio Communication, Mid-air Collision (MAC) Avoidance, Communications Data Rate and Bandwidth Usage, Antenna Type; Control and Stability: HTOL Aircraft, Convertible Rotor Aircraft, Payload Control, Sensors, Autonomy; Navigation: NAVSTAR Global Positioning System (GPS), TACAN, LORAN C, Inertial Navigation, Radio Tracking, Way-point Navigation; Launch and Recovery.

Design for Reliability: Determination of the Required Level of Reliability, Achieving Reliability,
Reliability Data Presentation, Multiplexed Systems, Reliability by Design, Design for Ease of Maintenance; Design for Manufacture and Development

UNIT-IV: THE DEVELOPMENT OF UAV SYSTEMS

System Development and Certification-System Development, Certification, Establishing Reliability; System Ground Testing: UAV Component Testing, UAV Sub- assembly and Sub-system Testing, Testing Complete UAV, Control Station Testing , Catapult Launch System Tests, Documentation; System In- flight Testing: Test Sites, Preparation for In-flight Testing, In- flight Testing, System certification.

UNIT-V: DEPLOYMENT AND FUTURE OF UAV SYSTEMS

Operational trials and full certification; UAV System Deployment- Network-centric Operations (NCO), Teaming with Manned and Other Unmanned System; Naval, arm and air force roles, civilian, paramilitary and commercial roles.

Text Books:

1. Reg Austin, Wiley, "Unmanned Aircraft Systems, UAVS Design and Deployment", 2nd Edition, 2010.

Reference Books:

1. Richard K. Barnhart, Stephen B. Hottman, Douglas M. Marshall, Eric Shappee, (eds.), "Introduction to Unmanned Aircraft Systems", CRC Press, 2012.
2. Valavanis, Kimon P., Vachtsevanos, George J. "Handbook of Unmanned Aerial Vehicles" AIAA series, 3rd Edition, 2004.

Course Outcomes:

- The student will be able to understand the design concepts of UAVs
- The student will be able to understand the electronic instrumentation associated with the UAVs
- It is also expected to understand the necessity of drone in various fields
- Gain the complete knowledge system development and UAV system testing
- To know about future of UAVs

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L	T/P/D	C
3	0	3

(R18DEC52) RESEARCH METHODOLOGY
(OPEN ELECTIVE – II)

Course Objectives

- Demonstrate the ability to choose methods appropriate to research aims and objectives
- Identify appropriate research topics
- Prepare a project proposal (to undertake a project) and organize and conduct research (advanced project) in a more appropriate manner
- Write a research report and thesis and Write a research proposal (grants)
- Understand the limitations of particular research methods and Develop advanced critical thinking skills

UNIT - I

Introduction: Research objective and motivation, Types of research, Research approaches, Significance, Research method vs. methodology, Research process.

UNIT - II

Formulating a research problem: Literature review, Formulation of objectives, Establishing Operational definitions, Identifying variables, constructing hypotheses.

UNIT - III

Research design and Data Collection: Need and Characteristics, Types of research design, Principles of Experimental research design, Method of data collection, Ethical issues in collecting data.

UNIT - IV

Sampling and Analysis of data: Need of Sampling, Sampling distributions, Central limit theorem, Estimation: mean and variance, Selection of sample size Statistics in research, Measures of Central tendency, Dispersion, asymmetry and relationships, Correlation and Regression analysis, Displaying data

UNIT - V

Hypothesis Testing: Procedure, Hypothesis testing for difference in mean, variance limitations, Chi-square test, Analysis of variance (ANOVA), Basic principles and techniques of writing a Research Proposal

Text Books:

1. R. C. Kothari, Research Methodology: Methods and Techniques, 2nd edition, New Age International Publisher, 2009
2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition, SAGE, 2005

References:

1. Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/>
2. (Electronic Version): StatSoft, Inc. (2012). Electronic Statistics Textbook. Tulsa, OK: StatSoft. WEB: http://www.statsoft.com/textbook/.(Printed Version): Hill, T. & Lewicki, P. (2007). STATISTICS: Methods and Applications. StatSoft, Tulsa, OK.

Course Outcomes

- Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
- Construct a coherent research proposal that includes an abstract, introduction, literature review, research questions, ethical considerations, and methodology. Have basic knowledge on qualitative research techniques
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Have basic awareness of data analysis-and hypothesis testing procedures
- Explain the difference between quantitative, qualitative, and mixed methods research and what types of research questions can be answered with each method

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L	T/P/D	C
-	3	2

(R18D1582) COMPUTER AIDED TESTING, ANALYSIS AND MODELING LABORATORY

Course Objectives:

- Model the 3-D geometric information of machine components including assemblies, and automatically generate 2-D production drawings, understand the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program.
- Improve visualization ability of machine components and assemblies before their actual fabrication through modeling, animation, shading, rendering, lighting and coloring.
- Model complex shapes including freeform curves and surfaces.
- Analyze the mode of heat transfer in piping system and Make use of CAD software to simulate mechanical systems
- Solve simple problems in Computational Fluid Dynamics (CFD)

TESTING:

1. Preparation and study of the Micro Structure of ferrous metals and alloys.
2. Preparation and study of the Microstructure of nonferrous metals and alloys.
3. Effect of tempering time on the hardness of quenched carbon steels.
4. Effect of tempering temperature on the hardness of a hardened carbon steels.
5. Preparation of metallic specimens by electro polishing.
6. Study of work hardening characteristics of a pure metal.
7. Determination of carbon percentage in the given ferrous specimen.

MODELING:

1. Surface modeling.
2. Solid modeling.
3. Drafting.
4. Assembling.

ANALYSIS OF STRUCTURES USING FEA PACKAGES:

1. Static Analysis.
2. Modal Analysis.
3. Harmonic Analysis.
4. Spectrum Analysis.
5. Buckling Analysis.
6. Analysis of Composites.
7. Fracture mechanics.
8. Transient analysis

Course Outcomes:

After Completion of this course students will be able to

- Understand the concepts of wireframe, surface and solid modeling.
- Understand part modeling and part data exchange standards (VDA, IGES, and STEP).
- Develop knowledge in 2D-Transformations, 3D Transformations.
- Understand the Assembly Modeling, Assembly tree, and Assembly Methods.
- The Students become experts on Visualization and computer animation Techniques

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L	T/P/D	C
2	-	-

(R18DHS56) ENGLISH FOR RESEARCH PAPER WRITING
(AUDIT COURSE II)

Course Objectives:

- To enable the students to use linguistic structures to form well-organized texts in research contexts.
- To improve the quality of a composition by using appropriate cohesive devices.
- To enhance the mechanics of writing skills using correct grammar and vocabulary.
- To equip learners with the strategies of error – free writing.
- To get complete knowledge to write the research paper.

INTRODUCTION

Writing a research paper is a significant part of any academia. It is a substantial piece of academic writing in which the author does independent investigation into a topic and writes a description of the findings of that study. Research studies are important because these contribute to a scholar's knowledge and also provides solutions to the latest challenges. Writing forces one to think about what he believes and what he wants to communicate. Since good writing skills allow a learner to communicate his message with clarity, an extensive exposure on techniques of writing research paper proves to be an immense value to the students .

SYLLABUS

Unit 1 - Sentence Formation
Word order, Structuring paragraphs, Breaking up long sentences

Unit 2 - Cohesive devices
Types of cohesive devices - Anaphoric reference, Cataphoric reference, Exophoric reference
Tense agreement

Unit 3 – Academic Vocabulary
Hedging, Transitions – Additive, Adversative, Causal, Sequential

Unit 4– Grammar for Research Papers
Active & Passive, Punctuation, Articles

Unit 5 – Academic writing
Removing redundancy, Avoiding ambiguity, Paraphrasing, Sample Abstracts for practice, Sample videos

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERENCE BOOKS:

1. English for Writing Research Papers. Adrian Wallwork, edition II, Springer, 2016.
2. Handbook of Technical Writing. James H. Shelton, McGraw Hill, 1994
3. Writing the Research Paper, a handbook. 8th edition, Anthony C. Winkler, Jo Ray Metherell,
Wadsworth, 2012

Course Outcomes:

Students will be able to:

- Write in a clear, coherent, and direct style appropriate for academic research
- Draft coherent and unified paragraphs with adequate supporting details.
- Develop the strategy to use lexical terms effectively.
- Adopt appropriate syntactic and semantic techniques
- Demonstrate analytical and inference skills. Comprehend and employ the various forms of scholarly composition.

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	-	**-**	**2**

(R18D1583) SEMINAR-I

Course Objectives:

- Understand the diverse field in Mechanical Engineering
- Understand the themes of this seminar
- Identify, understand and discuss current
- Understand the history of Mechanical research
- Identifies real-world issues

Course Outcomes:

- Learn and integrate
- Think and Create
- Communicate
- Clarify Purpose and Perspective
- Practice and use multiple thinking strategies to examine real- world issues

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M.Tech II Year –I Sem (Machine Design)	**L**	**T/P/D**	**C**
	-	**-**	**4**

(R18D1591) MINI PROJECT

Course Objectives:

- To be able to apply some of the techniques/principles you have been taught
- To carry out budget and time planning for the project.
- To inculcate implementation skills by basics of design using an appropriate analysis tool.
- To follow correct simulation practices
- To do effective methodology in the mini project

Course Outcomes:

- Demonstrate a through and systematic understanding of project contents.
- Understand methodologies and professional way of documentation and communication.
- Know the key stages in development of the project.
- Extend or use the idea in mini project.
- Create new ideas with the help of fundamentals of Mechanical Engineering

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M.Tech II Year –I Sem (Machine Design)	**L**	**T/P/D**	**C**
	-	**-**	**8**

(R18D1592) PROJECT REVIEW-I

Course Objectives:

- To provide an opportunity to work in group on a topic / problem / experimentation.
- To encourage creative thinking process.
- To provide an opportunity to analyze and discuss the results to draw conclusions.
- To acquire and apply fundamental principles of planning and carrying out the work plan project through observations, discussions and decision making process.
- To acquire the knowledge to publishing papers in peer reviewed journals/conference proceedings

Course Outcomes:

- Identify methods and materials to carry out experiments/develop code.
- Reorganize the procedures with a concern for society, environment and ethics.
- Analyze and discuss the results to draw valid conclusions.
- Prepare a report as per recommended format and defend the work.
- Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.

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M.Tech II Year – II Sem (Machine Design)	**L**	**T/P/D**	**C**
	-	**-**	**2**

(R18D1584) SEMINAR-II

Course Objectives:

- Understand the diverse field in Mechanical Engineering
- Understand the themes of this seminar
- Identify, understand and discuss current
- Understand the history of Mechanical research
- Identifies real-world issues

Course Outcomes:

- Learn and integrate
- Think and Create
- Communicate
- Clarify Purpose and Perspective
- Practice and use multiple thinking strategies to examine real- world issues

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M.Tech II Year – II Sem (Machine Design)	**L**	**T/P/D**	**C**
	-	**-**	**8**

(R18D1593) PROJECT REVIEW-II

Course Objectives:

- To provide an opportunity to work in group on a topic / problem / experimentation.
- To encourage creative thinking process.
- To provide an opportunity to analyze and discuss the results to draw conclusions.
- To acquire and apply fundamental principles of planning and carrying out the work plan project through observations, discussions and decision making process.
- To acquire the knowledge to publishing papers in peer reviewed journals/conference proceedings

Course Outcomes:

- Identify methods and materials to carry out experiments/develop code.
- Reorganize the procedures with a concern for society, environment and ethics.
- Analyse and discuss the results to draw valid conclusions.
- Prepare a report as per recommended format and defend the work.
- Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.

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	-	**-**	**8**

(R18D1594) PROJECT VIVA - VOCE

Course Objectives:

- Student understand the project and should give the clear explanation aboutthe project
- To provide the foundation of good programming skills by discussing key issues to the design of project.
- To be able to apply some of the techniques/principles students have been taught.
- To enable the students to attend placements and be better performers in their future.
- To familiarize with the various techniques.

Course Outcomes:

- Understand the data requirements and collect data relevant to their research.
- Analyze data and interpret results.
- Develop research design for their topic of research.
- Follow the process related activity and testing techniques to work as team member.
- Implement different system calls for various file handling operations.

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Maisammaguda, Dhulapally (Post Via Hakimpet), Secunderabad – 500100, Telangana State, India.

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MASTER OF TECHNOLOGY
AEROSPACE ENGINEERING

DEPARTMENT OF
AERONAUTICAL ENGINEERING

ACADEMIC REGULATIONS
COURSE STRUCTURE AND SYLLABUS

(Batches admitted from the academic year 2018 - 2020)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

"Autonomous Institution /College" means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

- "Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- "Commission" means University Grants Commission.
- "AICTE" means All India Council for Technical Education.
- "University" the Jawaharlal Nehru Technological University, Hyderabad.
- "College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- "Program" means:

  Master of Technology (M.Tech) degree program
  PG Degree Program: M.Tech

- "Branch" means specialization in a program like M.Tech degree program in Aeronautical Engineering, M.Tech degree program in Computer Science and Engineering etc.
- "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

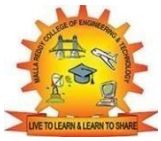
Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2008 Certified)

Maisammaguda, Dhulapally (Post Via Hakimpet), Secunderabad – 500100, Telangana State, India.
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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart the quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

M.TECH – AEROSPACE ENGINEERING
COURSE STRUCTURE & SYLLABUS

I Year I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P /D	C	MAX MARKS	
						INT	EXT
1	R18D7601	Aerodynamics of Flight Vehicles	3	-	3	30	70
2	R18D7602	Engineering Analysis of Flight Vehicles	3	-	3	30	70
3	R18D7603	Rocket and Missile Technology	3	-	3	30	70
4	R18D7607 R18D7608 R18D7609	Elective-1 1) Fundamentals of Aerospace Engineering* 2) Air-breathing Propulsion And Design 3)Flight Navigation and surveillance systems	3	-	3	30	70
5	R18D7610 R18D7611 R18D7612	Elective-2 1)Modeling and Simulation of Fluid Flows 2) Continuum Mechanics 3)Rotorcraft Aerodynamics	3	-	3	30	70
6	OE-I	Open Elective-I	3	-	3	30	70
7	R18D7681	Digital Simulation Lab-I		3	2	30	70
8	R18DHS54	Audit Course I - Value Education	2	-	-	50	-
Total			20	3	20	260	490

***Audit course: Non-credit course, 50% of scoring is required for the award of the degree**

*NOTE: *Fundamentals of Aerospace Engineering*

(Required to be taken by all students other than B.Tech Aeronautical/ Aerospace Engineering degree holders)

OPEN ELECTIVE I	
Subject Code	**Subject Name**
R18DME51	Non-Conventional Energy Sources
R18DME52	Industrial Safety
R18DME53	Operations Research
R18DHS51	Business Analytics
R18DCS51	Scripting Languages
R18DAE51	Mathematical Modeling Techniques
R18DEC51	Embedded Systems Programming

I Year II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P /D	C	MAX MARKS	
						INT	EXT
1	R18D7604	Aircraft Control and Simulation	3	-	3	30	70
2	R18D7605	Aerospace Sensors and Measurement Systems	3	-	3	30	70
3	R18D7606	Computational Approaches to Aerospace Vehicle Design	3	-	3	30	70
4	R18D7613 R18D7614 R18D7615	Elective-III 1) High Angle of Attack Aerodynamics 2) Advanced Topics in Air Traffic Management Systems 3) Flight Dynamics and Control	3	-	3	30	70
5	R18D7616 R18D7617 R18D7618	Elective-IV 1) Tactical Missile Design 2) Space Transportation Systems 3) Aero elasticity	3	-	3	30	70
6	OE-II	OPEN ELECTIVE- II	3	-	3	30	70
7	R18D7682	Digital Simulation Lab-II	-	3	2	30	70
8	R18DHS55	Audit Course II - English for Research Paper Writing	2	-	-	50	
Total			20	3	20	260	490

*Audit course: Non-credit course, 50% of scoring is required for the award of the degree

OPEN ELECTIVE II	
Subject Code	Subject Name
R18DME54	Composite Materials
R18DME55	Waste to Energy
R18DME56	Industrial Management
R18DHS52	Cost Management of Engineering Projects
R18DCS52	Information Security
R18DAE52	Unmanned Aerial Vehicles
R18DEC52	Research Methodology

II Year I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D7683	Seminar-I	-	-	2	50	-
2	R18D7691	Mini Project	-	-	4	100	-
3	R18D7692	Project Review-I	-	-	8	100	-
Total			-	-	14	250	-

II Year II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R18D7684	Seminar-II	-	-	2	50	-
2	R18D7693	Project Review-II	-	-	8	100	-
3	R18D7694	Project Viva-voce	-	-	8	-	100
Total			-	-	18	150	100

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
I Year M. Tech, ASP-I SEM	**3**	**-**	**3**

(R18D7601) AERODYNAMICS OF FLIGHT VEHICLES

UNIT-I: REVISION OF BASICS LEARNT AT UNDER GRADUATE LEVEL IN BRIEF

AERODYNAMIC CHARACTERISTICS OF AIRFOILS: Vortex sheet, Vortex sheet in thin-airfoil theory, Planar wing, Properties of symmetrical airfoil, Properties of cambered airfoil, Flapped airfoil, Numerical Solution of thin airfoil problem, Airfoil of arbitrary thickness and camber

UNIT II: THE FINITE WING

Flow fields around finite wings, Downwash and induced drag, Fundamental equations of finite-wing theory, Elliptical lift distribution, Arbitrary circulation distribution, Twisted wing: Basic and Additional lift, Approximate calculation of additional lift, Winglets, Stability and trim of wings, Higher approximations, The complete airplane, Interference effects,

AIRFOILS IN COMPRESSIBLE FLOWS

Boundary conditions, subsonic airfoils Prandtl-Glauert transformation, Critical Mach number, Drag divergence Mach number, Airfoils in transonic flow, Airfoils in supersonic flow

UNIT-III: WINGS AND WING-BODY COMBINATIONS IN COMPRESSIBLE FLOW

Wings and bodies in compressible flows: Prandtl-Glauert-Goethert transformation, Influence of sweepback, Design rules for wing-fuselage combinations

LAMINAR BOUNDARY LAYER IN COMPRESSIBLE FLOW

Conservation of energy in the boundary layer, Rotation and entropy gradient in the boundary layer, Similarity considerations for compressible boundary layers, Solution of energy equation for Prandtl number unity, Temperature recovery factor, Heat transfer versus skin friction, Velocity and temperature profiles and skin friction, Effects of pressure gradient

UNIT-IV: FLOW INSTABILITIES AND TRANSITION FROM LAMINAR TO TURBULENT FLOW

Gross effects, Reynolds experiment, Tollmien-Schlichting instability and transition, Natural laminar flow and laminar flow control, Stability of vortex sheets, Transition phenomenon, Methods for experimentally detecting transition, Flow around spheres and circular cylinders

TURBULENT FLOWS

Description of turbulent field, Statistical properties, Conservation equations, Laminar sub-layer, Fully developed flows in tubes and channels, Constant-pressure turbulent boundary layer, Turbulent drag reduction, Effects of pressure gradient, Stratford criterion for turbulent separation, Effects of compressibility on skin friction, Reynolds analogy: Heat transfer and temperature recovery factor, Free turbulent shear flows

AIRFOIL DESIGN, MULTIPLE SURFACES, VORTEX LIFT, SECONDARY FLOWS, VISCOUS EFFECTS

Airfoil design for high C_{lmax}, multiple lifting surfaces, Circulation control, Stream wise vorticity,

Secondary flows, Vortex lift strakes, Flow about three-dimensional bodies, unsteady lift

UNIT-V: UNSTEADY AERODYNAMICS

Unsteady lifting force coefficient, Unsteady aerodynamics of slender wings, Compressible Unsteady aerodynamics, Equations of motion, Boundary condition, Moving coordinate system, Navier Stoke equations, Aerodynamic forces and moments, Turbulence modelling, Numerical Problems

INCOMPRESSIBLE FLOW OVER AN AIRFOIL

Steady flow, Unsteady flow, Simple Harmonic Motion, Lowey's problem: returning Wake problem, Arbitrary motion and Wagner Function, Gust problem and Kussner function. Numerical Problems

INCOMPRESSIBLE FLOW OVER WINGS

Steady flow: Lifting line theory (results), Weissinger's L – method, Low aspect ratio wings, unsteady flow: Reissner's Approach, Numerical solutions, Numerical Problems

TEXT BOOKS

1. *Foundations of Aerodynamics*: Bases of Aerodynamic Design, Arnold M. Kuethe and Chuen- Yen Chow, John Wiley & Sons, Inc., Fifth Edition, 1997, ISBN: 978-0-471-12919-6

2. *Fundamentals of Modern Unsteady Aerodynamics*, Gulcat, Ulgen, Springer, Publications, ISBN 978-3-642-14761-6

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
I Year M. Tech, ASP-I SEM	**3**	**-**	**3**

(R18D7602) ENGINEERING ANALYSIS OF FLIGHT VEHICLES

UNIT-I: THE MORPHOLOGY OF FLIGHT VEHICLES

Introduction, Key factors affecting vehicles configuration, some representative flight vehicles.

UNIT-II: EQUATIONS OF MOTION FOR RIGID FLIGHT VEHICLES

Definitions, Vector and Scalar realizations of Newton's second law, The tensor of inertia, Choice of vehicle axes, Principal axes, Stability axes, Aerodynamic axes, Orientation of the vehicle relative to the ground; flight path determination, Gravitational terms in the equations of motion, The state vector, Equations of motion; Aerodynamic Approximations; stability derivatives; Estimation of stability derivatives: Longitudinal.

INTRODUCTION TO VEHICLE AERODYNAMICS

Aerodynamics contributions to X, Y and M, dimensionless coefficients defined, equations of perturbed longitudinal motion.

UNIT-III: AIRCRAFT DYNAMICS

Equations of Motion of Aircraft including forces and moments of control surfaces, Dynamics of control surfaces

STATIC STABILITY, TRIM STATIC PERFORMANCE AND RELATED SUBJECTS

Impact of stability requirements on design and longitudinal control, Static performance

UNIT-IV: DYNAMIC PERFORMANCE OF SPACECRAFT WITH RESPECT TO NON-ROTATING PLANETS

Introduction, Numerical integration of ordinary differential equations, Simplified treatment of boost from a non-rotating planet, An elementary look at staging, Equations of boost from a rotating planet.

UNIT-V: DYNAMIC PERFORMANCE OF SPACECRAFT

Equations of Motion of Launch Vehicles with respect to a rotating planet, Motion of Spacecraft with respect to a rotating planet.

DYNAMIC PERFORMANCE-ATMOSPHERIC ENTRY

Equation of motion, Approximate analysis of gliding entry into a planetary atmosphere.

TEXT BOOK

1. Engineering Analysis of Flight Vehicles, Holt Ashley, Dover Publications, 1992

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year M. Tech, ASP-I SEM

L	T/P/D	C
3	-	3

(R18D7603) ROCKET AND MISSILE TECHNOLOGY

UNIT-I: INTRODUCTION

Rockets and military missiles – function, types, role, mission, mission profile, thrust profile, propulsion system, payload, staging, control and guidance requirements Performance measures, design, construction ,operation-similarities and differences .Some famous space launch vehicles and strategic missiles.

UNIT-II: SOLID AND LIQIUD PROPULSION SYSTEMS

Solid propellant rocket motors, principal features .applications, solid propellants, types, composition, properties, performance. Propellantgrain, desirableproperties, grainconfiguration, preparation. loading. structural design of grain .Combustion instabilities. Liners, insulators and inhibitors-function, requirements, materials. Rocket motor casing –materials. Nozzles –types, design-construction, thermal protection. Igniters, types, construction. Description of modern solid boosters I) Space Shuttle SRB II) the Arienne SRB

Liquid propellants –types, composition, properties. Performance .Propellant tanks, feed systems – pressurisation, turbo-pumps-valves and feed lines, injectors, starting and ignition .Engine cooling support structure. Control of engine starting and thrust build up. System calibration, integration and optimization –safety and environmental concerns combustion instabilities. Description of the space shuttle main engine .Propellant slosh, propellant hammer, geysering effect in cryogenic rocket engines. Tsiolskovsky's rocket equation in the absence of gravity, vertical motion in the earth's gravitational field , inclined motion , flight path at constant pitch angle , motion in the atmosphere , the gravity turn-the culmination altitude, Multi staging. Earth launch trajectories –vertical segment , the gravity turn ,constant pitch trajectory , orbital injection. Actual launch vehicle trajectories –types. Examples, the Mu-3-S-II. Ariane, Pegasus launchers, Reusable launch vehicles – future launchers –launch assist technologies

UNIT-III: AERODYNAMICS OF ROCKETS AND MISSILES AND ATTITUDE CONTROL

Classification of missiles, Airframe components of rockets and missiles. Forces acting on a missile while passing through atmosphere, method of describing aerodynamic forces and moments .lateral aerodynamic moment

,lateral damping moment , longitudinal moment of a rocket, lift and drag forces, drag estimation ,body up wash and down wash in missiles. Rocket dispersion. re-entry body design considerations Rocket thrust vector control – methods of thrust vector control for solid and liquid propulsion systems, thrust magnitude control .thrust termination; stage separation dynamics , separation techniques

UNIT-IV: MATERIALS AND ROCKET TESTING

Criteria for selection of materials for rockets and missiles- requirements for choice of materials for propellant tanks, liners, insulators, inhibitors, at cryogenic temperatures, requirements of materials at extremely high temperatures, requirements of materials for thermal protection and for pressure vessels.Ground testing and flight testing-

types of tests, test facilities and safeguards monitoring and control of toxic materials, instrumentation and data management. Ground testing, flight testing, trajectory monitoring, post accident procedures. Description of a typical space launch vehicle launches procedure.

UNIT-V: ALTERNATIVE PROPULSION SYSTEMS AND FLIGHT VEHICLES

Hybrid propulsion system .Ramjet propulsion and its performance and limitations, the scramjet engine – construction , flow process , drag components , fuel injection systems , applications , components performance analysis –Hypersonic transport vehicles, missions , trajectories, sounding rockets , cruise missiles , unmanned Aerial Vehicles and drones , Micro Aerial Vehicles – applications of these vehicles

TEXT BOOKS

1. Sutton, GP. and Biblarz, ., Rocket Propulsion Elements, 7th edition, Wiley-Interscience, 2000.
2. Cornelisse, J.W., Schoyer H.F.R. and Wakker. K.F., Rocket propulsion and space flight dynamics ,pitman 1979
3. Turner ,M.J.L., Rocket and Spacecraft Propulsion ,springer ,2001
4. Hill ,PG. and Peterson ,CR, Mechanics and Thermodynamics of propulsion , 2nd edition , Addison Wesley ,1992

REFERNCE BOOKS

1. Anderson JD., Introduction to flight 5th edition ,Tata McGraw Hill ISBN: 0-07-006082-4
2. James all the world flight vehicles Jones aviation publications London

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year M. Tech, ASP-I SEM

L	T/P/D	C
3	-	3

(R18D7607) FUNDAMENTALS OF AEROSPACE ENGINEERING* (ELECTIVE-I)

UNIT-I: INTRODUCTION TO AEROSPACE ENGINEERING

Brief history of Aeronautics, Anatomy of the Airplane, Anatomy of a Space Vehicle, The Nature of Aerodynamic forces and dimensional analysis; Theory and experiment: wind tunnels, Atmosphere: Properties of U.S. standard atmosphere, Definitions of altitude,

UNIT-II: INCOMPRESSIBLE ONE DIMENSIONAL FLOWS AND COMPRESSIBLE FLUIDS

Continuity equation, Bernoulli's equation, Application of Bernoulli's equation: Airspeed indicators and wind tunnels, One-dimensional compressible flow concepts, Speed of sound, Compressible flow equations in a variable-area stream tube, Application to airspeed measurement, Applications to channels and wind tunnels

TWO-DIMENSIONAL FLOW AND FINITE WING: Limitations of one-dimensional flow equations, Theory of lift: circulation, Airfoil pressure distribution, Helmholtz vortex theorems, Simulating the wing with a vortex line, Downwash, Elliptic lift distribution, Lift and drag: momentum and energy, Slope of finite wing lift curve, Verification of Prandtl wing theory, Additional effects of wing vortices, Search for reduced induced drag

UNIT-III: EFFECTS OF VISCOSITY, TOTAL DRAG

Boundary layer, Boundary layer on bluff bodies, Creation of circulation, Laminar and turbulent boundary layers: skin friction, Nature of Reynolds number, Effect of turbulent boundary layer on separation; Parasite drag, Drag due to lift, Importance of aspect ratio; Prediction of drag divergence Mach number, Sweptback wings, Total drag, Supersonic flow: shock waves and Mach waves, Supersonic wing lift and drag, Area rule, Supersonic aircraft,

AIRFOILS, WINGS AND HIGHLIFT SYSTEMS: Early airfoil development, Modern airfoils, Supersonic airfoils, Airfoil pitching moments, Effects of sweepback on lift, airfoil characteristics, Airfoil selection and wing design; Airfoil maximum lift coefficient, Leading and trailing edge devices, Effect of sweepback, Deep stall, Effect of Reynolds number, Propulsive lift

UNIT-IV: AERODYNAMIC PERFORMANCE, STABILITY AND CONTROL

Level flight performance, Climb performance, Range, Endurance, Energy-state approach to airplane performance, Takeoff performance, landing performance; Static longitudinal stability, Dynamic longitudinal stability, Dynamic lateral stability, Control and Maneuverability: turning performance, Control systems, Active controls

UNIT-V: AEROSPACE PROPULSION AND AIRCRAFT STRUCTURES

Aerospace Propulsion: Piston engines, Gas turbines, Speed limitations of gas turbines: ramjets, Propellers, Overall propulsion efficiency, Rocket engines, Rocket motor performance, Propulsion- airframe integration; Aircraft structures: Importance of structural weight and integrity, Development of aircraft structures, Importance of fatigue, Materials, Loads, Weight estimation

ROCKET TRAJECTORIES, ORBITS AND REENTRY

Rocket trajectories, Multistage rockets, Escape velocity, Circular orbital or satellite velocity, Elliptical

orbits, Orbital maneuvers.

TEXT BOOK

1. Fundamentals of Flight, Richard S. Shevell, Pearson Education Publication, ISBN 81-297-0514-1, 1989

REFERENCE BOOK

2. Introduction to Flight, John D. Anderson, Jr., Tata McGraw-Hill Publishing Company, Fifth Edition, Fifth Edition, 2007, ISBN 13: 978-0-07-066082-3

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
I Year M. Tech, ASP-I SEM	**3**	**-**	**3**

(R18D7608) AIR-BREATHING PROPULSION AND DESIGN (ELECTIVE-I)

UNIT-I: FUNDAMENTALS OF JET PROPULSION

Aircraft Propulsion, Thermodynamic relations and cycles involved, Classification of Air breathing Engines, Ideal and Real Cycle Analysis - Turbojet and Turbofan, Effects of Altitude, Mach number, Aircraft Performance and Engine Performance analysis, Aircraft Engine Design, Methods employed for Thrust Augmentation and Jet Engine Noise suppression.

UNIT-II: INLETS AND NOZZLES

Types of Inlets, Combined Area Changes and Friction, Supersonic Inlet Design Considerations, Engine Starting, Effect of Additive Drag, Types of nozzles, Performance Map, Non-ideal equations for Various Nozzles, Effects of Pressure Ratios on Engine Performance, Performance Maps, Methods and advantages in reversing the Thrust, Types of Thrust Vectoring.

COMBUSTION CHAMBER

Classification of combustion chamber, Process of Combustion, factors affecting combustion, Chemical Kinetics, Properties of various fuels used in aviation, Flame Stabilization, Ignition and Engine Starting, Adiabatic Flame Temperature, Pressure Losses, Design and Optimization, Performance Maps.

UNIT-III: COMPRESSORS AND TURBINES

Classification of Compressors, Euler's Turbo-Machinery Equations, components of axial flow compressor, stage, Velocity Triangles, Single-Stage Energy Analysis, Variable Stators, Radial Equilibrium and Streamline Analysis Method; Centrifugal Compressors- Geometry, Velocity triangles, Impeller Design, Performance Maps;

Axial Flow Turbines- Geometry, Single-Stage Energy analysis, Velocity Triangles, Performance Maps, Thermal Limits of Blades and Vanes, Numerical problems and Performance Analysis.

RAMJETS

Working principle of Ramjet engine, Combustors for liquid fuel ramjet engines, Combustion Instability and its Suppression, Solid fuel Ramjet Engines, Test bed of Ramjet engine, Advancements in ramjets- Ram-rockets- Performance analysis, Ducted and Shrouded types, Air-augmented rockets, Integrated ramjet-rocket systems, Nozzle-less solid propellant rockets and Integrated Ramjet-rocket boosters, Dump combustors. Problems related to combustion, CFD techniques and guide lines required in designing and development of combustor employed in ramjets.

UNIT-IV: HYPERSONIC AIR-BREATHING PROPULSION

Hypersonic Air-breathing Propulsion, SCRAM jet engines-Methods of Analysis, Hypersonic Intakes, Supersonic Combustors, Engine Cooling and Materials Problem, CFD Applications, Liquid Air-cycle Engines, Space Plane Applications, Experimental and Testing Facilities, The Shock tube and shock Tunnel, Hypersonic wind tunnel.

UNIT-V: DESIGN OF GAS TURBINE ENGINE

Aircraft Mission Analysis, Engine Selection- Performance and Parametric Analysis, Sizing the

Engine, Major Considerations in Engine Component Design - Rotating Turbo-machinery, Combustion Systems, Inlets and Exhaust Nozzles

SYSTEM MATCHING AND ANALYSIS

Matching of Gas Turbine Components, Cycle Analysis of one and two spool engines, Gas Generator, Component Modeling, Solution of Matching Problem, Dynamic or Transient behavior, Matching of Engine and Aircraft, Use of Matching and Cycle analysis in Second stage design

TEXT BOOKS

1. Gas Turbine theory, Cohen H., Rogers G.F.C, Saravanamutto H., Longman Publication, 4th Edition, 2003
2. Elements of Propulsion: Gas turbines and Rockets, Jack D. Mattingly, AIAA Education series, 2nd Edition, 2006
3. Aircraft Engine Design, Jack D. Mattingly, AIAA Education Series, 2nd Edition, 2008.
4. Hypersonic Air breathing Propulsion, William H. Heiser, David T. Pratt, AIAA Education Series, 1st Edition, 1994

REFERENCE BOOK

1. Gas Tables, Third edition E. Radha Krishnan, University press.
2. Fundamentals of Jet Propulsion with applications, Ronald D. Flack, Cambridge University Press, 1st Edition, 2005.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
I Year M. Tech, ASP-I SEM	**3**	**-**	**3**

(R18D7609) FLIGHT NAVIGATION AND SURVEILLANCE SYSTEMS

(ELECTIVE-I)

UNIT-I: ROLE OF NAVIGATION IN FLIGHT VEHICLE MISSION - NAVIGATION EQUATIONS:

Introduction: Definitions of navigation and surveillance, Guidance versus navigation, Categories of navigation, Civil and military aircraft, Phases of flight, Design trade-offs, Evolution of avionics, Human navigator; Navigation Equations: Geometry of the Earth, Coordinate frames, Dead-reckoning computations, Positioning,Terrain-matching navigation, Course computation, Navigation errors, Digital charts, Software development

UNIT-II: TERRESTRIAL-RADIO-NAVIGATION SYSTEMS:

General principles, System design considerations, Point source systems, Hyperbolic systems

SATELLITE RADIO NAVIGATION: System configuration, Basics of satellite radio navigation, Orbital mechanics and clock characteristics, Atmospheric effects on satellite signals, NAVSTAR Global Positioning System, Global Orbiting Navigation Satellite System(GLONASS), GNSS integrity and availability

UNIT-III: INERTIAL NAVIGATION

Inertial navigation system, Instruments, Platforms, Mechanization equations, Error analysis, Alignment, Fundamental limits

AIR-DATA SYSTEMS, ATTITUDE AND HEADING REFERENCES: Air-Data Systems: Air-data measurements, Air-data equations, Air-data systems, Specialty designs, Calibration and system test; Attitude and Heading References: Basic instruments, Vertical references, Heading references, Initial alignment of heading references

UNIT-IV:

DOPPLER AND ALTIMETER RADARS, LANDING SYSTEMS

Doppler Radars: Functions and applications, Doppler radar principles and design approaches, Signal characteristics, Doppler radar errors, Equipment configurations, Radar Altimeters: Functions and applications, General principles, Pulsed radar altimeters, FM-CW radar altimeter, Phase-coded pulsed radar altimeters; Landing Systems: Low-visibility operations, Mechanics of landing, Automatic landing systems, Instrument landing systems, Microwave-landing system, Satellite landing systems, Carrier landing systems,

UNIT-V: MULTISENSOR INTEGRATED NAVIGATION SYSTEMS

Inertial system characteristics, Integrated stellar-inertial systems, Integrated Doppler- inertial systems, Airspeed-damped inertial system, Integrated stellar-inertial-doppler system, Position update of an inertial system, Noninertial GPS multisensory navigation systems, Filtering of measurements, Kalman filter basics, Open-loop and closed loop Kalman filter mechanizations, GPS-INS mechanization, Practical considerations, Federated system architecture

AIR TRAFFIC MANAGEMENT Services provided to aircraft carriers, Government responsibilities, Flight rules and airspace organization, Airways and procedures, Phases of flight, Subsystems, Facilities and operations, System capacity, Airborne Collision Avoidance Systems

TEXT BOOKS

1. *Avionics Navigation Systems,* Second Edition, Myron Kayton and Walter R.Freid, John Wiley & Sons, Inc, 1997, ISBN 0-471-54795-6

2. *Civil Avionics Systems,* Moir, I and Seabridge, A, AIAA Education Series, AIAA, 2002, ISBN 1-56347589-8

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year M. Tech, ASP-I SEM

L	T/P/D	C
3	-	3

(R18D7610) MODELING AND SIMULATION OF FLUID FLOWS
(ELECTIVE-II)

UNIT-I: BASIC EQUATIONS OF FLUID DYNAMICS AND DYNAMICAL LEVELS OF APPROXIMATION

General form of a conservation law, Mass conservation equation, Momentum conservation law or equation of motion, Energy conservation equation; Navier–Stokes equations, Approximations of turbulent flows, Thin shear layer approximation, Parabolized Navier–Stokes equations, Boundary layer approximation, Distributed loss model, Inviscid flow model: Euler equations, Potential flow model.

UNIT II: MATHEMATICAL NATURE OF THE FLOW EQUATIONS AND THEIR BOUNDARY CONDITIONS

Simplified models of a convection–diffusion equation, Definition of the mathematical properties of a system of PDEs, Hyperbolic and parabolic equations: characteristic surfaces and domain of dependence, Time-dependent and conservation form of the PDEs, Initial and boundary conditions

UNIT III: DISCRETIZATION TECHNIQUES

Finite Difference Method for Structured Grids: Basics of finite difference methods, Multidimensional finite difference formulas, Finite difference formulas on non-uniform grids, General method for finite difference formulae, Implicit finite difference formulae; Finite Volume Method: Conservative discretization, Basis of finite volume method, Practical implementation of finite volume method; Introduction to Finite Element Method: Finite element definition of interpolation functions, Finite element definition of the equation discretization: integral formulation, Method of weighted residuals or weak formulation, Galerkin method, Finite element Galerkin method for a conservation law; Structured and Unstructured Grid Properties: Structured grids, Unstructured grids, Surface and volume estimations, Grid quality and best practice guidelines

UNIT IV: ANALYSIS OF NUMERICAL SCHEMES

Consistency, stability and error analysis of numerical schemes: Basic concepts and definitions, Von Neumann method for stability analysis, New Leapfrog, Lax-Fredrichs and Lax-Wendroff schemes for the linear convection equation, Spectral analysis of numerical errors; General Properties and High Resolution Numerical Schemes: General formulation of numerical schemes, Generation of new schemes with prescribed order of accuracy, Monotonicity of numerical schemes, Finite volume formulation of schemes and limiters

TIME INTEGRATION METHODS FOR SPACE DISCRETIZED EQUATIONS

Analysis of space-discretized systems, Analysis of time integration schemes, Selection of time integration methods, Implicit schemes for multidimensional problems: Approximate factorization method

UNIT V: ITERATIVE METHODS FOR RESOLUTION OF ALGEBRAIC SYSTEMS

Basic iterative methods, Overrelaxation methods, Preconditioning techniques, Nonlinear problems,

Multigrid method.

NUMERICAL SIMULATION OF INVISCID FLOWS

Euler equations, Potential flow model, Numerical solutions for the potential equation, Finite volume discretization of the Euler equations, Numerical solutions for the Euler equation

NUMERICAL SOLUTIONS OF VISCOUS LAMINAR FLOWS Navier-Stokes Equations for laminar flows, Density based methods for viscous flows, Numerical solutions with the density-based method, Pressure correction method, Numerical solutions with pressure correction method.

TEXT BOOK

1. Numerical Computation of Internal and External Flows, Second Edition, Charles Hirsch, Elsevier Publication, 2007

REFERENCE BOOKS

1. Computational Fluid Dynamics: The Basics with Applications, John David Anderson, McGraw Hill, 1995
2. Computational Fluid Mechanics and Heat Transfer, 2nd Edition, John C. Tannehill, Dale A. Anderson, Richard H. Pletcher, Taylor & Francis, 1997.

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(R18D7611) CONTINUUM MECHANICS
(ELECTIVE-II)

UNIT I:
INTRODUCTION, VECTORS AND TENSORS
Background and Overview, Vector Algebra - Definition of a Vector, Scalar and Vector Products, Plane Area as a Vector, Components of a Vector, Summation Convention, Transformation Law for Different Bases; Theory of Matrices - Definition, Matrix Addition and Multiplication of a Matrix by a Scalar, Matrix Transpose and Symmetric Matrix, Matrix Multiplication, Inverse and Determinant of a Matrix; Vector Calculus - Derivative of a Scalar Function of a Vector, The del Operator, Divergence and Curl of a Vector, Cylindrical and Spherical Coordinate Systems, Gradient, Divergence and Curl Theorems; Tensors- Dyads and Polyads, Nonion Form of a Dyadic, Transformation of Components of a Dyadic, Tensor Calculus, Eigenvalues and Eigenvectors of Tensors

UNIT II:
KINEMATICS OF CONTINUA
Introduction, Description of Motion- Configurations of a Continuous Medium, Material Description, Spatial Description, Displacement Field; Analysis of Deformation- Deformation gradient tensors, Isochoric, Homogeneous and Inhomogeneous Deformations, Change of volume and surface; Strain Measures- Cauchy-Green deformation tensors, Green Strain tensor, Physical Interpretation of the Strain Components, Cauchy and Euler Strain Tensors, Principal Strains; Infinitesimal Strain Tensor and Rotation Tensor- Infinitesimal Strain Tensor, Physical Interpretation of Infinitesimal Strain Tensor Components, Infinitesimal Rotation Tensor, Infinitesimal Strains in Cylindrical and Spherical Coordinate Systems; Rate of Deformation and Vorticity Tensors- Definitions, Relationship between D and E, .Polar Decomposition Theorem, Compatibility Equations, Change of Observer- Material Frame Indifference.

UNIT III:
STRESS MEASURES
Introduction, Cauchy Stress Tensor and Cauchy's Formula, Transformation of Stress Components and Principal Stresses- Transformation of Stress Components, Principal Stresses and Principal Planes, Maximum Shear Stress. Other Stress Measures - Preliminary Comments, First Piola- Kirchhoff Stress Tensor, Second Piola- Kirchhoff Stress Tensor, Equations of Equilibrium.
CONSERVATION OF MASS, MOMENTA AND ENERGY
Introduction, Conservation of Mass - Preliminary Discussion, Material Time Derivative, Continuity Equation in Spatial Description, Continuity Equation in Material Description ,Reynolds Transport Theorem. Conservation of Momenta - Principle of Conservation of Linear Momentum, Equation of Motion in Cylindrical and Spherical Coordinates, Principle of Conservation of Angular Momentum,Thermodynamic Principles - Introduction, The First Law of Thermodynamics: Energy Equation, Special Cases of Energy Equation, Energy Equation for One-Dimensional Flows , The Second Law of
Thermodynamics.

Unit – IV
CONSTITUTIVE EQUATIONS
Introduction, Elastic Solids - Generalized Hooke's Law, Material Symmetry, Monoclinic Materials, Orthotropic Materials, Isotropic Materials, Transformation of Stress and Strain Components, Nonlinear Elastic Constitutive Relations, Constitutive Equations for Fluids - Ideal Fluids, Viscous Incompressible Fluids, Non-Newtonian Fluids, Heat Transfer - General Introduction, Fourier's Heat Conduction Law, Newton's Law of Cooling, Stefan-Boltzmann Law, Electromagnetics - Maxwell's Equation, Constitutive Relations.

LINEARIZED ELASTICITY

Governing Equations, The Navier Equations, The Beltrami-Michell Equations, Types of Boundary Value Problems and Superposition Principle. Clapeyron's theorem and Reciprocity Relations - Clapeyron's theorem, Betti's Reciprocity Relations, Maxwell's Reciprocity Relation, Solution Methods, Types of Solution Methods, Example: Rotating Thick Walled Cylinder; Two-Dimensional Problems, Airy Stress Function, End Effects: Saint-Venant's Principle, Torsion of Noncircular Cylinders. Principle of Minimum Total Potential Energy - Total Potential Energy Principle, Derivation of Navier's Equations, Castiglian's Theorem I . Hamilton's Principle-Hamilton's Principle for a Rigid Body, Hamilton's Principle for a Continuum

UNIT V:

FLUID MECHANICS AND HEAT TRANSFER

Governing Equations- Preliminary Comments, Summary of Equations, Viscous Incompressible Fluids, Heat Transfer; Fluid Mechanics Problems - Inviscid Fluid Statics, Parallel Flow (Navier-Stokes Equations), Problems with Negligible Convective Terms; Heat Transfer Problems- Heat Conduction in a Cooling Fin, Axisymmetric Heat Conduction in a Circular Cylinder, Two-Dimensional Heat Transfer, Coupled Fluid Flow and Heat Transfer

LINEAR VISCOELASTICITY

Preliminary Comments- Initial Value Problem, the Unit Impulse, and the Unit Step Function, The Laplace Transform Method, Spring and Dashpot Models - Creep Compliance and Relaxation Modulus, Maxwell Element , Kelvin-Voigt Element, Three-Element Models , Four-Element Models , Integral Constitutive Equations, Hereditary Integrals, Hereditary Integrals for Deviatoric Components, The Correspondence Principle, Elastic and Viscoelastic Analogies

TEXT BOOK

1. *An Introduction to Continuum Mechanics*, J.N. Reddy, Cambridge University Press, 2007

REFERENCE BOOKS

1. *Continuum Mechanics*, George. E. Mase, Schaum's Outline Series, McGraw-Hill Book Company, 1969
2. *Continuum Mechanics*, Ellis H. Dill, CRC Press, 2006
3. Continuum Mechanics for Engineers, Second Edition, George E. Mase, G.Thomas Mase CRC Press,1999
4. *Computational Continuum Mechanics*, Ahmed A. Shabana, Cambridge University Press, 2008
5. *Introduction to Computational Mechanics*, Fourth Edition, W. Michael Lai, David Rabin and Erhard krempl, .Elsevier Inc, 2010
6. *Introduction to the Mechanics of a Continuous Medium*, Lawrence E. Malvern, Prentice- Hall, 1969
7. *A First Course in Continuum Mechanics,* Y. C. Fung, Prentice Hall, 1994

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(R18D7612) ROTORCRAFT AERODYNAMICS
(ELECTIVE-II)

UNIT-I:

FUNDAMENTALS OF ROTOR AERODYNAMICS, BLADE ELEMENT ANALYSIS: Momentum theory analysis in hovering flight, Disk loading and power loading, Induced inflow ratio, Thrust and power coefficients, Comparison of theory with measured rotor performance, Non-ideal effects on rotor performance, Figure of merit, Induced tip loss, Rotor solidity and blade loading coefficients, Momentum analysis in axial climb and descent, Momentum analysis in forward flight, Blade Element Analysis in hover and axial flight, forward flight

UNIT-II:

ROTATING BLADE MOTION: Types of rotors, Equilibrium about the flapping hinge and lead-lag hinge, Equations of motion for a flapping blade, Blade feathering and the swashplate, Dynamics of a lagging blade with a hinge offset, Coupled flap-lag motion, Coupled pitch-flap motion, Other types of rotors, Introduction to rotor trim

HELICOPTER PERFORMANCE: Hovering and axial climb performance, Forward flight performance, Performance analysis, Autorotational performance, Vortex ring state(VRS), Ground effect, Performance in maneuvering flight, Factors influencing performance degradation

UNIT-III:

AERODYNAMIC DESIGN OF HELICOPTERS: Overall design requirements, Conceptual and preliminary design processes, Design of the main rotor, Fuselage aerodynamic design issues, Empennage design, Role of wind tunnels in aerodynamic design, Design of tail rotors, Other anti-torque devices, High speed rotorcraft, Smart rotor systems, Human-powered helicopter, Hovering micro air vehicles

AERODYNAMICS OF ROTOR AIRFOILS: Helicopter rotor airfoil requirements, Reynolds number and Mach number effects, Airfoil shape definition, Airfoil pressure distribution, Aerodynamics of a representative airfoil section, Pitching moment and related issues, Drag, Maximum lift and stall characteristics, Advanced rotor airfoil design, Representing static airfoil characteristics, Circulation controlled airfoils, Very low Reynolds number airfoil characteristics, Effects of damage on airfoilperformance

UNIT-IV:

UNSTEADY AIRFOIL BEHAVIOR: Sources of unsteady aerodynamic loading, Concepts of blade wake, Reduced frequency and reduced time, Unsteady attached flow, Principles of quasi-steady thin airfoil theory, Theodorsen's theory, Returning wake-Loewy's problem, Sinusoidal gust-Sear's problem, Indicial response-Wagner's problem, Sharp edged gust-Kussner's problem, Traveling sharp edged gust- Milne's problem, Time varying incident velocity, Indicial method for subsonic compressible flow, Non-uniform vertical velocity fields, Time-varying incident Mach number, Unsteady aerodynamics of flaps, Principles of noise produced by unsteady forces,

UNIT-V:

DYNAMIC STALL: Flow morphology of dynamic stall, Dynamic stall in the rotor environment, Effects of forcing conditions on dynamic stall, Modeling of dynamic stall, Torsional damping, Effects of sweep angle, airfoil shape on dynamic stall, Three dimensional effects on dynamic stall, Time-varying velocity effects on dynamic stall, Prediction of in-flight airfoils, Stall control

ROTOR WAKES AND BLADE TIP VORTICES, ROTOR-AIRFRAME INTERACTIONAL AERODYNAMICS:

Characteristics of rotor wake in hover and forward flight, Vortex models of rotor wake, Aperiodic wake developments, General dynamic inflow models, Descending flight and vortex ring state, Wake developments in maneuvering flight; Rotor-fuselage interactions, Rotor-empennage interactions, Rotortail rotor interactions

TEXT BOOK

1. Principles of Helicopter Aerodynamics, Second Edition, J. Gordon Leishman, Cambridge University Press, 2006, ISBN 0-521-85860-7

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(R18DME51) NON CONVENTIONAL ENERGY SOURCES (OPEN ELECTIVE-I)

UNIT-I

Introduction: Energy Scenario, Survey of energy resources. Classification and need for conventional energy resources.

Solar Energy: The Sun-sun-Earth relationship, Basic matter to waste heat energy circuit, Solar Radiation, Attention, Radiation measuring instruments.

Solar Energy Applications: Solar water heating. Space heating, Active and passive heating, Energy storage, Selective surface, Solar stills and ponds, solar refrigeration, Photovoltaic generation.

UNIT -II

Geothermal Energy: Structure of earth, Geothermal Regions, Hot springs. Hot Rocks, Hot Aquifers. Analytical methods to estimate thermal potential. Harnessing techniques, Electricity generating systems.

UNIT-III

Direct Energy Conversion: Nuclear Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic, Thermionic and Thermoelectric generation and MHD generator.

Hydrogen Gas as Fuel: Production methods, Properties, I.C. Engines applications, Utilization strategy, Performances.

UNIT-IV

Bioenergy: Biomass energy sources. Plant productivity, Biomass wastes, aerobic and anaerobic bioconversion processes, Raw material and properties of bio-gas, Bio-gas plant technology and status, the energetic and economics of biomass systems, Biomass gasification

UNIT-V

Wind Energy: Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types, Betz model. Interference factor. Power coefficient, Torque coefficient and Thrust coefficient, Lift machines and Drag machines. Matching Electricity generation.

Energy from Oceans: Tidal energy, Tides, Diurnal and semi-diurnal nature, Power from tides, Wave Energy, Waves, Theoretical energy available. Calculation of period and phase velocity of waves, Wave power systems, submerged devices. Ocean thermal Energy, Principles, Heat exchangers, Pumping requirements, Practical considerations.

TEXTBOOKS:

1. Non-conventional Energy Sources / GD Rai/Khanna publications.
2. Non-Conventional Energy Sources and Utilisation (Energy Engineering)/ R KRajput/S.Chand.
3. Renewable Energy Sources /Twidell & Weir/Taylor and Francis/ 2nd special Indian edition.

REFERENCE BOOKS:

1. Renewable Energy Resources- Basic Principles and Applications/ G.N.Tiwari and M.K.GhosalNarosa Publications.
2. Renewable Energy Resources/ John Twidell & Tony Weir/Taylor & Francis/2nedition.
3. Non Conventional Energy / K.Mittal/ Wheeler.

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(R18DME52) INDUSTRIAL SAFETY
(OPEN ELECTIVE –I)

Objectives:

- To explain the concept of various industrial safety methods.
- To outline division aspects measurements of safety performance .

UNIT-I :
Importance of Safety, health and environment. Health safety and environmental policy, fundamentals of safety, classification of accidents, Managements responsibility, objectives of safety management, National safety council, Employees state insurance act 1948, approaches to prevent accidents, principles of safety management, safety organization, safety auditing, maintenance of safety, measurements of safety performance, industrial noise and noise control, Industrial Psychology, Industrial accidents and prevention. Introduction to OSHAS 18001 AND OSHA.

UNIT II:
Process safety management (P.S.M) as per OSHA, legal aspects of safety, safety with respect to plant and machinery, the explosive act 1884, Petroleum act 1934, personal protective equipment, classification of hazards, protection of respiratory system, work permit system, hazards in refineries and process plants, safety in process plants, pollution in some typical process industry.

UNIT III:
Safe working practices, housekeeping, safe working environment, safety device and tools, precaution in use of ladders, safety instruction during crane operation, safety instruction for welding, burning and cutting and gas welding equipment, electrical safety, case studies, safety in use of electricity, electric shock phenomena, Occurrence of electric shock, medical analysis of electric shock and its effect, safety procedures in electric plants, installation of Earthing system,

UNIT IV:
Safety in hazardous area, hazard in industrial zones, classification of industrial Enclosures for gases and vapors. Mechanical, Chemical, Environmental and Radiation hazards, Machine guards and safety devices, slings, load limits, lifting tackles and lifting equipment, hydrostatic test, Chemical hazards, industrial toxicology, toxic chemicals and its harmful effects on humans, factors influencing the effect of toxic materials, Units of concentration, control measure, environmental hazards, devices for measuring radiation, safety analysis and risk analysis, risk management, First aid, Safety measures to avoid occupational diseases.

UNIT V
Factories act – 1948 Stuatutory authorities – inspecting staff, health, safety, provisions relating to hazardous processes,welfare, working hours, employment of young persons – special provisions – penalties and procedures- Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules – electricity act and rules

Text books :

1. Industrial safety management By: L.M. Deshmukh Publishers: Tata Megraw Hill ,New Delhi Year: 2006 Edition: First
2. The Factories Act 1948, Madras Book Agency, Chennai, 2000

References:

1. Industrial safety health and environment Management system By: R.K. Jain & Sunil S. Rao Publishers: Khanna Publishers Year: 2008 Edition: Second
2. The Indian boilers act 1923, Commercial Law Publishers (India) Pvt.Ltd., Allahabad.
3."Accident prevention manual for industrial operations", N.S.C.,Chicago, 1982.
4. Industrial Safety and Environment by Amit Gupta
5. "Safety in Industry" N.V. Krishnan JaicoPublishery House, 1996.

Outcome of course:

- Educate students about how to reduce work place hazards and to encourage the standard of Safety ,Health & Environment programme , so as to aim 0% accidents and 100% safety in different industries in which Industrial Safety plays an important role.
- This has the blending mixture of both Learning and Skills.

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(R18DME53) OPERATIONS RESEARCH
(OPEN ELECTIVE –I)

Objectives:
- To familiarize the students with the use of practice oriented mathematical applications for optimization functions in an organization.
- To familiarize the students with various tools of optimization, probability, statistics and simulation,
- To applicable in particular scenarios in industry for better management of various resources.

UNIT–I
Introduction: Development – Definition– Characteristics and Phases – Types of models – operation Research models– applications.
Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method –Artificial variables techniques -Two–phase method, Big-M method.

UNIT–II
Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.
Sequencing – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

UNIT–III
Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.
Theory of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT–IV
Waiting Lines: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.
Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.
UNIT–V
Dynamic Programming: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.
Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Simulation Languages.

TEXT BOOKS :
1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Hiller &Libermann (TMH).
3. Introduction to O.R /Taha/PHI

REFERENCE BOOKS:

1. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson . Education.
2. Operations Research / R.Pannerselvam,PHI Publications.
3. Operation Research /J.K.Sharma/MacMilan.

OUTCOMES:

- Student will be able to Illustrate the need to optimally utilize the resources in various types of industries.
- Apply and analyze mathematical optimization functions to various applications.
- Demonstrate cost effective strategies in various applications in industry.

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(R18DHS51) BUSINESS ANALYTICS

(OPEN ELECTIVE –I)

Learning Objective: To understand the importance of ever-increasing volume, variety and velocity of data in organization and application of data analytical tools for decision making.
Learning Outcome: Students will be able to understand a) Importance of Analytics b) Understanding the analytical tools c) Application of Analytical tools to solve business problems.

Unit-I: Introduction to Business Analytics: Importance, Scope, Evolution, Classification, and Application; Data Structure-Visualization of Data, Data Architecture, Measurement Scale; Decision Models-Classification, Structure of Decision Models; Data Structure and Data View-Understanding of data, exploring data using pivot tables.

Unit-II: Descriptive Analytics: Descriptive Statistical Measures–Population and samples, Measures of location, Measures of Dispersion, Measures of variability, measures of Association. Probability distribution and Data Modeling – Discrete Probability distribution, Continuous Probability distribution, Random sampling from Probability Distribution, Data Modeling and Distribution fitting.

Unit-III: Predictive Analytics: Karl Pearson Correlation Techniques -Multiple Correlation-Spearman's Rank correlation-Simple and Multiple regression-Regression by the method of least squares –Building good regression models –Regression with categorical independent variables --Linear Discriminant Analysis-One way and Two Way ANOVA

Unit-IV: Data Mining: Scope of Data Mining, Data Exploration and Reduction, Unsupervised learning – cluster analysis, Association rules, Supervised learning-Partition Data, Classification Accuracy, prediction Accuracy, k-nearest neighbors, Classification and regression trees, Logistics Regression.

Unit-V: Simulation: Random Number Generation, Monte Carlo Simulation, What if Analysis, Verification and Validation, Advantages and Disadvantages of Simulation, Risk Analysis, Decision Tree Analysis.

References:

- James Evans, Business Analytics, 2e, Pearson.
- Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney, Williams Essential of Business Analytics, Cengage Learning.
- Thomas Eri, Wajid Khattack & Paul Buhler: Big Data Fundamentals, Concepts, drivers and Techniques by Prentice Hall of India, New Delhi.
- Akil Maheswari: Big Data, Upskill ahead by Tata McGraw Hill, New Delhi.
- Seema Acharya & Subhashini Chellappan: Big Data and Analytics, Wiley Publications, New Delhi.
- S. Christian Albright, Wayne L. Winston: Business Analytics: Data Analysis & Decision Making, Cengage Learning

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(R18DCS51) SCRIPTING LANGUAGES
(OPEN ELECTIVE – I)

Objectives: The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance perl - finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming Php and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk- Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.

2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.

3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.

2. Programming Python, M.Lutz, SPD.

3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.

4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.

5. Core Python Programming, Chun, Pearson Education.

6. Guide to Programming with Python, M.Dawson, Cengage Learning.

7. Perl by Example, E.Quigley, Pearson Education.

8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.

10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).

11. Perl Power, J.P.Flynt, Cengage Learning.

12. PHP Programming solutions, V.Vaswani, TMH.

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(R18DAE51) MATHEMATICAL MODELING TECHNIQUES
(OPEN ELECTIVE-I)

UNIT-I: INTRODUCTION TO MODELING AND SINGULAR PERTURBATION METHODS

Definition of a model, Procedure of modeling: problem identification, model formulation, reduction, analysis, Computation, model validation, Choosing the model, Singular Perturbations: Elementary boundary layer theory, Matched asymptotic expansions, Inner layers, nonlinear oscillations

UNIT-II: VARIATIONAL PRINCIPLES AND RANDOM SYSTEMS

Variational calculus: Euler's equation, Integrals and missing variables, Constraints and Lagrange multipliers, Variational problems: Optics-Fermat's principle, Analytical mechanics: Hamilton's principle, Symmetry: Noether's theorem, Rigid body motion, Random systems: Random variables, Stochastic processes, Monte Carlo method

UNIT-III: FINITE DIFFERENCES: ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

ODE: Numerical approximations, Runge-Kutta methods, Beyond Runge-Kutta, PDE: Hyperbolic equations-waves, Parabolic equations-diffusion, Elliptic equations-boundary values

CELLULAR AUTOMATA AND LATTICE GASES

Lattice gases and fluids, Cellular automata and computing

UNIT- IV: FUNCTION FITTING AND TRANSFORMS

Function fitting: Model estimation, Least squares, Linear least squares: Singular value decomposition, Non-linear least squares: Levenberg-Marquardt method, Estimation, Fisher information, and Cramer- Rao inequality, Transforms: Orthogonal transforms, Fourier transforms, Wavelets, Principal components

FUNCTION FITTING ARCHITECTURES

Polynomials: Pade approximants, Splines, Orthogonal functions, Radial basis functions, Over-fitting, Neural networks: Back propagation, Regularization

UNIT-V: OPTIMIZATION AND SEARCH

Multidimensional search, Local minima, Simulated annealing, Genetic algorithms

FILTERING AND STATE ESTIMATION

Matched filters, Wiener filters, Kalman filters, Non-linearity and entrainment, Hidden Markov models

TEXT BOOK

1. The Nature of Mathematical Modeling, Neil Gershenfeld, Cambridge University Press, 2006, ISBN 0-521-57095-6

REFERENCE BOOKS

1. Mathematical Models in the Applied Sciences, A. C. Fowler, Cambridge University Press, 1997, ISBN 0-521- 46140-5
2. A First Course in Mathematical Modeling, F. R. Giordano, M.D. Weir and W.P. Fox, 2003, Thomson, Brooks/Cole Publishers

3. Applied Numerical Modeling for Engineers, Donald De Cogan, Anne De Cogan, Oxford University Press, 1997

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(R18DEC51) EMBEDDED SYSTEMS PROGRAMMING (OPEN ELECTIVE –I)

UNIT I - EMBEDDED OS (LINUX) INTERNALS

Linux internals: Process Management, File Management, Memory Management, I/O Management. Overview of POSIX APIs, Threads – Creation, Cancellation, POSIX Threads Inter Process Communication - Semaphore, Pipes, FIFO, Shared Memory
Kernel: Structure, Kernel Module Programming Schedulers and types of scheduling.
Interfacing: Serial, Parallel Interrupt Handling Linux Device Drivers: Character, USB, Block & Network

UNIT II- OPEN SOURCE RTOS

Basics of RTOS: Real-time concepts, Hard Real time and Soft Real-time, Differences between General Purpose OS & RTOS, Basic architecture of an RTOS, Scheduling Systems, Inter-process communication, Performance Matric in scheduling models, Interrupt management in RTOS environment, Memory management, File systems, I/O Systems, Advantage and disadvantage of RTOS.

UNIT III – OPEN SOURCE RTOS ISSUES

POSIX standards, RTOS Issues - Selecting a Real Time Operating System, RTOS comparative study. Converting a normal Linux kernel to real time kernel, Xenomai basics.
Overview of Open source RTOS for Embedded systems (Free RTOS/ Chibios-RT) and application development.

UNIT IV – VXWORKS / FREE RTOS

VxWorks/ Free RTOS Scheduling and Task Management - Realtime scheduling, Task Creation, Intertask Communication, Pipes, Semaphore, Message Queue, Signals, Sockets, Interrupts I/O Systems - General Architecture, Device Driver Studies, Driver Module explanation, Implementation of Device Driver for a peripheral

UNIT V – CASE STUDY

Cross compilers, debugging Techniques, Creation of binaries & porting stages for Embedded Development board (Beagle Bone Black, Rpi or similar), Porting an Embedded OS/ RTOS to a target board ().Testing a real time application on the board

TEXT BOOKS:

1. Essential Linux Device Drivers, Venkateswaran Sreekrishnan
2. Writing Linux Device Drivers: A Guide with Exercises, J. Cooperstein
3. Real Time Concepts for Embedded Systems – Qing Li, Elsevier

REFERENCES:

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK
3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17the IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society
4. Real-time Systems – Jane Liu, PH 2000
5. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A
6. Structured Development for Real - Time Systems V1 : Introduction and Tools: Ward, Paul T & Mellor, Stephen J
7. Structured Development for Real - Time Systems V2 : Essential Modeling Techniques: Ward, Paul T & Mellor, Stephen J
8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J
9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H
10. Embedded Software Primer: Simon, David E.
11. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill

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L	T/P/D	C
0	3	2

(R18D7681) DIGITAL SIMULATION LAB – I

I. MATLAB/ SIMULINK FUNDAMENTALS FOR AEROSPACE APPLICATIONS

MATLAB introduction, Plotting and graphics: Plot, log and semi-log plots, polar plots,Subplots, axis, mesh, contour diagrams, flow diagrams, movies, MATLAB Toolboxes: Continuous transfer functions, root locus, Nichols chart, Nyquist chart, linear quadratic regulator, state-space design, digital design, Aerospace toolbox; M Cells, Structures and M-files, MEX-files,

Standard Simulink libraries, Simulink aerospace blockset, Building Simulink linear models: transfer function modeling in Simulink, zero pole model, state-space model; Simulink LTI viewer and usage of it, equivalent Simulink LTI models, Single-Input, Single-Output(SISO) design tool, Building Multi-Input, Multi
–Output models, Building Simulink S-functions; Stateflow introduction: Opening, executing, and saving stateflow models, constructing a simple stateflow model, using a stateflow truth table

II. SOFTWARE DEVELOPMENT FOR SIMULATION OF FLUID FLOWS

1. Generation of structured and unstructured grids in two and three dimensions
2. Solution of Burgers equation using explicit MacCormack method
3. Blasius solution for laminar boundary layer over a flat

III. FLOW SIMULATION

Simulation of Flow past airfoils and wings
Simulation of Compressible flow in convergent-divergent nozzle
Simulation of compressible flow in a compressor

REFERENCES

1. Basic MATLAB, Simulink, and State Flow, Richard Colgren, AIAA Education Series, 2007
2. Introduction to Simulink with Engineering Applications, Steven T. Karris, Orchard Publications, 2006, ISBN –9744239-8-X
3. Computational Fluid Mechanics and Heat Transfer, Second Edition, John C. Tannehill, Dale A. Anderson, Richard H. Pletcher, Taylor & Francis Publication, 1997.
4. Computational Fluid Dynamics, T. J. Chung, Cambridge University Press, 2002

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(R18DHS54)VALUE EDUCATION
(Audit Course I)

UNIT I:

Values and self-development

Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation. Standards and principles, Value judgements

UNIT II:

Importance of cultivation of values

Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity. Power of faith, National Unity, Patriotism, Love for nature, Discipline

UNIT III:

Personality and Behavior Development

Soul and Scientific attitude, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness ,Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature

UNIT IV:

Character and Competence

Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence ,Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively

TEXT BOOKS:

1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

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L	T/P/D	C
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(R18D7604) AIRCRAFT CONTROL AND SIMULATION

UNIT-I: THE KINEMATICS AND DYNAMICS OF AIRCRAFT MOTION

Vector Kinematics, Matrix Analysis of Kinematics, Geodesy, Earth's Gravitation, Terrestrial Navigation, Rigid-Body Dynamics.

UNIT-II: MODELING THE AIRCRAFT

Basic Aerodynamics, Aircraft Forces and Moments, Static Analysis, The Nonlinear Aircraft Model, Linear Models and the Stability Derivatives.

MODELING, DESIGN AND SIMULATION TOOLS

State Space Models, Transfer Function Models, Numerical Solution of the State Equations, Aircraft Models for Simulation, Steady State Flight, Numerical Linearization, Feedback control, Aircraft dynamic behavior.

UNIT-III: AIRCRAFT DYNAMICS AND CLASSICAL CONTROL DESIGN

Aircraft Rigid Body Modes, The Handling Qualities Requirements, Stability Augmentation Systems, control augmentation system, auto pilots and Nonlinear Simulation.

UNIT-IV: MODERN DESIGN TECHNIQUES

Assignment of Closed-Loop Dynamics, Linear Quadratic Regulator with Output Feedback, Tracking a Command, Modifying the Performance Index, Model Following Design, Linear Quadratic Design with Full State Feedback, Dynamic Inversion Design.

UNIT-V: ROBUSTNESS AND MULTIVARIABLE FREQUENCY DOMAIN TECHNIQUES

Multivariable Frequency Domain Analysis, Robust Output Feedback Design, Observers and the Kalman Filter.

DIGITAL CONTROL

Simulation of Digital Controllers, Discretization of Continuous Controllers, Modified Continuous Design, Implementation Considerations.

TEXT BOOK

1. Aircraft Control and Simulation, Brian L. Stevens and Frank L. Lewis, John Wiley & Sons, 2003

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(R18D7605) AEROSPACE SENSORS AND MEASUREMENT SYSTEMS

UNIT-I: **INTRODUCTION TO EXPERIMENTAL METHODS**
Characteristics of Measuring systems:: Readability, Sensitivity, Hysteresis, Accuracy, Precision: Calibration, Standards, Experiment planning, Causes and types of experimental errors, Statistical analysis of experimental data

UNIT II: **FLOW MEASUREMENTS**
Pressure Measurement: Manometer, Pressure transducers, Scanning valves; Temperature Measurement: Thermometers, Thermocouples, Thermopiles, Keil probes; Velocity Measurement: Pitot probes, Hot wires, 7 hole probes, Laser Doppler Velocimetry (LDV), Particle Image Velocimetry (PIV), Doppler Global Velocimetry(DGV) ; Turbulence Measurements: LDV, Hot wire anemometers, Root Mean Square(RMS), Spectrum;

FLOW VISUALIZATION
Path-, Streak-, Stream-, and Time lines, Direct visualization, Surface flow visualization, Flow field visualization, Data driven visualization

UNIT-III: **FORCES AND MOMENTS FROM WIND TUNNEL BALANCE MEASUREMENTS:** Types of wind tunnels, Aeronautical wind tunnels, Wind tunnel data systems, Balances, Balance requirements and specifications, External balances and internal balances

STRESS AND STRAIN MEASUREMENTS
Stress and strain, Strain measurements, Strain gauge types, Basic characteristics of a strain gauge, Electrical resistance strain gauges, Rosette analysis, Strain gauge sensitivity, Stress gauges

UNIT IV: **MOTION AND VIBRATION MEASUREMENT**
Two simple vibration instruments, Principles of seismic instrument, Practical considerations for seismic instruments, Sound measurements

MOTION AND INERTIAL MEASUREMENTS
Applications of accelerometer sensors, Acceleration sensing principles, Pendulous accelerometer (open and closed loop), Micro-machined accelerometer, Piezoelectric accelerometer, Rate gyroscope principles, Rate-integrating gyroscope principles, Micro-gyro sensors, Laser gyros

UNIT-V: **SPACECRAFT ATTITUDE DETERMINATION SENSORS**
Infrared earth sensors-Horizon Crossing Sensors, Sun sensors, Star sensors, Rate and rate integrating gyros, Magnetometers

TEXT BOOKS

1. *Experimental Methods for Engineers,* Seventh Edition, J. P. Holman, Tata McGraw Hill, 2004
2. *Measurement Systems-Application and Design,* 5th Edition, Ernest O Doebelin, Dhanesh N Manik, Tata McGraw Hill, 2007
3. *Low-Speed Wind Tunnel Testing,* Jewel B Barlow, William H. Rae,Jr. , Alan Pope, John Wiley, Third Edition, 1999
4. *Spacecraft Dynamics and Control-A Practical Engineering Approach,* Marcel J. Sidi, Cambridge University Press, 1997

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(R18D7606) COMPUTATIONAL APPROACHES TO AEROSPACE VEHICLE DESIGN

UNIT-I: PRINCIPLES OF AEROSPACE DESIGN

Historical perspective on aerospace design,Traditional manual approaches to design and design iteration, Design teams, Advances in modeling techniques:, Tradeoffs in aerospace system design, Design automation, evolution and innovation, Design search and optimization, Take-up of computational methods, Design oriented Analysis: Geometry modeling and design parameterization, Computational mesh generalization, Analysis and design of coupled systems

UNIT-II: ELEMENTS OF NUMERICAL OPTIMIZATION-I

Single variable optimizers- line search, Multi variable optimizers: Population versus single point methods, Gradient based methods, Noisy/Approximate function values, Non-gradient based algorithms, Termination and convergence aspects, Constrained optimization, Problem transformations, Lagrange multipliers, Feasible directions method, Penalty function methods, Combined Lagrangian and penalty function methods, Sequential quadratic programming, Chromosome repair

UNIT-III: ELEMENTS OF NUMERICAL OPTIMIZATION-II

Meta models and Response surface methods: Global versus local meta models, Meta modeling tools, Simple RSM examples, Combined approaches-Hybrid searches and meta heuristics, Multi-objective optimization, Multi-objective weight assignment techniques, Methods for combining goal functions, fuzzy logic and physical programming, Pareto set algorithms

Sensitivity Analysis: Finite-difference methods, Complex variable approach, Direct methods, Adjoint mehods, Semi-analytical methods, Automatic differentiation

UNIT-IV: APPROXIMATION CONCEPTS

Local approximations, Multipoint approximations, Black-box modeling, Generalized linear models, Sparse approximations techniques, Gaussian process interpolation and regression, Data parallel modeling, Design of experiments, Surrogate modeling using variable fidelity models, Reduced basis methods

DESIGN SPACE EXPLORATION-SURROGATE MODELS

Managing surrogate models in optimization: Trust regions, Space mapping approach, Surrogate assisted optimization using global models, Managing surrogate models in evolutionary algorithms

UNIT-V: DESIGN IN THE PRESNCE OF UNCERTAINTY

Uncertainty modeling and representation, Uncertainty propagation, Taguchi methods, Welch-Sacks method, Design for six sigma, decision theoretic formulations, Reliability-based optimization, Robust design using information-gap theory, Evolutionary algorithms for robust design

MULTI-DISCIPLINARY OPTIMIZATION

Multi-disciplinary analysis, Fully integrated optimization, System decomposition and optimization, Simultaneous analysis and design, Distributed analysis optimization formulation, Collaborative optimization, Concurrent subspace optimization, Co-evolutionary architectures

TEXT BOOK

1. *Computational Approaches for Aerospace Design-The Pursuit of Excellence*, Andy J. Keane, Prasanth B. Nair, John Wiley & Sons, 2005, ISBN 10:0-470-85540-1

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(R18D7613) HIGH ANGLE OF ATTACK AERODYNAMICS

(ELECTIVE-III)

UNIT-I:

Description Of Flows At High Angles Of Attack: Introduction, Finite lifting wing of medium and highaspect ratio at low subsonic speeds, Low aspect ratio rectangular wing at low subsonic speeds, Slenderdelta type wings, Flow over elongated slender bodies, Aircraft type configurations, Vortex breakdown,Non-steady aerodynamics at high angles of attack on slender configurations, Effect of separation at **high angles of attack in hypersonic flows**

UNIT-II:

Topology Of Separating And Reattaching Vortical Flows: Equations for vortical flows, Topologicalconcepts for the analysis of vortical flows,

Linear Aerodynamics Of Wings And Bodies: Equations for potential subsonic flows, Equations for the lifting wing at low speeds, Linear panel methods for the calculation of the subsonic aerodynamic coefficients for wings and bodies, Low and higher order linear panel methods for subsonic and supersonic flows, Comparison of various panel methods

UNIT-III:

Vortex Flows And The Rolled Up Vortex Wake: Vortex core of the rolled up wake, Rolled up tip vortices, Rolling up of vortex wake behind wings, Bursting of rolled up vortices

Nonlinear Aerodynamics Of Wings And Bodies At High Angles Of Attack: Analytical and semiempirical methods for calculations of the non-linear aerodynamic characteristics

UNIT-IV:

Nonlinear Panel Methods For Aircraft And Missile Configurationsat High Angles Of Attack: Nonlinear Vortex Lattice Method (NVLM) for subsonic flows, Free vortex sheet method for subsonic flows,NVLM for supersonic flows

Solutions Of Euler Equations For Flows Over Configurations At High Angles Of Attack: Euler equations, Numerical methods of solution of the Euler equations: Grid generation methods, Finite volume methods, Finite difference methods, finite element methods, multigrid calculations with Cartesian gridsand local refinements, Euler computations on three-dimensional configurations at high angles of attack

UNIT-V:

Solutions Of Navier-Stokes Equations For Flows Over Configurations At High Angkes Of Attack: Formulation of the Navier-Stokes equations, Numerical methods for solutions of Navier-Stokes equations, Method of solution of the thin layer equations, Grid topology, boundary and initial conditions,Solutions of Navier-Stokes equations for flows in three-dimensional configurations at high angles of attack

TEXT BOOK

1. *High Angle of Attack Aerodynamics-Subsonic, Transonic, and Super sonic Flows*, Josef Rom, Springer-Verlag, 1992

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(R18D7614) ADVANCED TOPICS IN AIR TRAFFIC MANAGEMENT SYSTEMS

(ELECTIVE-III)

UNIT- I: AIR TRAFFIC MANAGEMENT

Introduction: Air traffic services provided to aircraft operators, Government responsibilities, Flight rules and airspace organization, Airways and procedures, Phases of flight, Subsystems of ATM system, Facilities and operation, System capacity, Airborne collision avoidance systems, Future trends, Capacity driven operational concept of ATM.

UNIT-II: ECONOMICS OF CONGESTION

Impact of ATM on airspace user economic performance, Effects of schedule disruptions on the economics of airline operations, modeling of an airline operations control center.

COLLABORATIVE DECISION MAKING

Effect of shared information on pilot controller and controller- controller interactions, Modeling of distributed human decision making in traffic flow management operations.

UNIT-III: AIRPORT OPERATIONS AND CONSTRAINTS

Analysis, modeling and control of ground operations at airports, Collaborative optimization of arrival and departure traffic flow management strategies at airports.

AIRSPACE OPERATIONS AND CONSTRAINTS

Performance measures of air traffic services, Identification of airport and airspace capacity constraints.

UNIT-IV: SAFETY AND FREE FLIGHT

Accident risk assessment for advanced air traffic management, Airborne separation assurance systems. Human factors

COGNITIVE WORKLOAD ANALYSIS AND ROLE OF AIR TRAFFIC CONTROLLER: Task load measures of air traffic controllers, Technology enabled shift in controller roles and responsibilities.

UNIT-V: AIRCRAFT SELF SEPARATION

Cooperative optimal airborne separation assurance in free flight airspace, Automatic dependent surveillance broadcast system - operational evaluation.

TEXT BOOKS

1. Fundamentals of Air Traffic Control, Fourth edition, Nolan, M.S., Thomson Learning, 2004, ISBN- 13:978-0-534-39388-5.
2. Air Transportation Systems Engineering, Donohue, G. L. et al., (Editors), AIAA, 20003, ISBN 1-56347-474-3
3. Avionics Navigation Systems, Keyton, M. and Fried, W. R., John Wiley, 2001, ISBN 0-471-54795-6

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(R18D7615) FLIGHT DYNAMICS AND CONTROL (ELECTIVE-III)

UNIT-I: INTRODUCTION

Basic principles of flight; Flying control surfaces: Elevator, ailerons and rudder; Pilot‟s controls: The throttle, the control column, modes of flight; Basic principles governing aerodynamic flows: Introduction, continuity principle, Bernoulli‟s principle, laminar flows and boundary layers, turbulent flows, aerodynamics of airfoils and wings, slender body aerodynamics, wing-body interference, empennage aerodynamics, aerodynamics of complete aircraft, aerodynamic forces and moments

UNIT-II: MECHANICS OF EQUILIBRIUM FLIGHT

Introduction, speeds of equilibrium flight, basic aircraft performance, conditions for minimum drag, range and endurance estimation, trim, stability of equilibrium flight, longitudinal static stability, maneuverability, lateral stability and stability criteria, experimental determination of aircraft stability margins; Aircraft non- linear dynamics; Equations of motion, introduction, aircraft dynamics, aircraft motion in a two dimensional plane, moments of inertia, Euler‟s equations and the dynamics of rigid bodies, aircraft equations of motion, motion-induced aerodynamic forces and moments, non-linear dynamics of aircraft motion, trimmed equations of motion

UNIT-III: SMALL PERTURBATIONS AND THE LINEARISED, DECOUPLED EQUATIONSOF MOTION

Small perturbations and linearization; Linearizing the aerodynamic forces and moments: Stability derivative concept, direct formulation in the stability axis, decoupled equations of motion, decoupled equations of motion in terms of the stability axis aerodynamic derivatives, decoupled equations of motion in terms of the stability axis aerodynamic derivatives.

Non-dimensional longitudinal and lateral dynamics; Simplified state-space equations of longitudinal and lateral dynamics, simplified concise equations of longitudinal and lateral dynamics.

UNIT-IV: LONGITUDINAL AND LATERAL LINEAR STABILITY AND CONTROL

Dynamic and static stability, modal description of aircraft dynamics and the stability, aircraft lift and drag estimation, estimating the longitudinal aerodynamic derivatives, estimating the lateral aerodynamic derivatives, aircraft dynamic response, numerical simulation and non-linear phenomenon longitudinal and lateral modal equations, methods of computing aircraft dynamic response, system block diagram representation, atmospheric disturbance, deterministic disturbances, principles of random atmospheric disturbance modeling, application to atmospheric turbulence modeling, aircraft non-linear dynamic response phenomenon.

UNIT-V: AIRCRAFT FLIGHT CONTROL

Automatic flight control systems: An introduction, functions of a flight control system, integrated flight control system, flight control system design.

TEXT BOOK

1. Vepa, R., “Flight Dynamics, Simulation and Control: For Rigid and Flexible Aircraft”, CRC Press, Taylor and Francis Group, 2015.

REFERENCES

1. Wayne Durham, “Aircraft Flight Dynamics and Control”, CRC Press, 2nd Edition 2013.
2. Robert F. Stengel “Flight Dynamics”. CRC Press, 2nd Edition 2013

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(R18D7616) TACTICAL MISSILE DESIGN
(ELECTIVE-IV)

UNIT-I:

Introduction / Key Drivers In Design Process: Tactical Missile characteristics, Conceptual design process, Examples of State-of-the-Art missiles, Aerodynamic configuration sizing parameters, Examples of alternatives in establishing mission requirements, Baseline missile

UNIT-II:

Aerodynamic Considerations In Tactical Missile Design: Missile diameter tradeoff, Nose fineness tradeoff, Boat-tail, Lifting body versus axi-symmetric body, Wings versus no wings, Normal force prediction for surfaces, Wing aerodynamic center prediction, Wing drag prediction, Surface planform geometry tradeoffs, Flight control alternatives, Maneuver alternatives, Roll orientation, Static stability, Tail area sizing, Stability and control conceptual design criteria, Body buildup

Propulsion Considerations In Tactical Nissile Design: Propulsion alternatives assessment, Ideal ramjet Mach number and temperature technology limit, Ramjet specific impulse prediction, Ramjet thrust prediction, Ramjet engine/booster integration, Ramjet inlet options, Ramjet inlet spillage, Inlet shock loss, Ramjet missile drag due to booster integration, Fuel alternatives, Rocket motor performance, Solid motor grain alternatives, Solid rocket thrust control, Solid propellant material alternatives, Motor case alternatives, Rocket nozzle material alternatives

UNIT-III:

Weight Considerations In Tactical Missile Design: Benefits of lighter weight missile, Subsystem weight sensitivity to flight performance, Missile weight prediction, Centre-of-gravity and moment-of-inertia prediction, Factor of safety, Micro Machined Electro-Mechanical Systems(MEMS), Manufacturing processes, Airframe material alternative, Aerodynamic heating prediction, Insulation trades, Insulation material alternatives, Structure design, Seeker dome materials, Thermal stress, Localized aerodynamic heating

Flight Performance Considerations In Tactical Missile Design: Flight performance envelope, Equations of motion modeling, Driving parameters for flight performance, Cruise flight performance, Steady state flight, Flight trajectory shaping, Turn radius, Coast flight performance, Boost flight performance, Intercept lead angle and velocity, Comparison with performance requirements

UNIT-IV:

Measures Of Merit And Launch Platform Integration: Robustness, Warhead lethality, Miss distance, Carriage and launch observables, Other survivability considerations, Reliability, Cost, Launch platform integration

Sizing Examples: Air-to-Air range requirements, Wing sizing for maneuverability, Weight and miss distance harmonization, Ramjet missile range robustness, Ramjet propulsion/fuel alternatives, Ramjet missile surface impact velocity, Computer-Aided sizing for conceptual design, Verification process

UNIT-V:

Development Process, Summary And Lessons Learned: Development Process:Technology Assessment/Roadmap, Phases of Development/Design maturity, Tactical-missile follow-on programs, Subsystem integration, Examples of technology development, Examples of State-of-the-Art advancement, New technologies for tactical missiles; Summary and Lessons Learned: Iterate-the-System-of-Systems Analysis, Exploit diverse skills, Apply creative skills, Identify high-payoff measures of merit, Start with a good baseline design, Conduct balanced tradeoffs, Evaluate a broad range of alternatives, Refine the design, Evaluate technology risk, Maintain real-time documentation, Develop good documentation, Utilize group skills, Balance the tradeoff of importance versus priority, Iterate the configuration design, Configuration sizing conceptual design criteria

TEXT BOOKS

1. Tactical Missile Design, Eugene L. Freeman, First Edition, AIAA Education Series, 2001

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(R18D7617) SPACE TRANSPORTATION SYSTEMS

(ELECTIVE-IV)

UNIT-I: **INDIAN SPACE TRANSPORTATION SYSTEM DEVELOPMENT**

Introduction, Systems engineering definition, System engineer, Systems engineering cycle, Systems engineering process, Doctrine of successive refinement, Tools and methodologies, Systems analysis, Modeling, and the trade study process, Basic launch vehicle system trade analysis methodology, System effective studies.

Evolution of ISRO, organization and structure of ISRO, Goals, objectives, evolution of Indian carrier rockets- PSLV, GSLV, Chandrayan, Mangalyan

UNIT II: **TRANSPORTATION SYSTEM ARCHITECTURE, INFRASTRUCTURES AND U.S. SPACE SHUTTLE**

Introduction, Historical drivers for space infrastructure, Political considerations, National mission model, Private sector and commercialization, Development of commercial space transportation architecture and system concepts, Cost drivers for space transportation architecture options, Recommended improvements to space transportation architectures, Planning for future space infrastructure, Transportation Infrastructure for moon and mars missions U.S. Space Shuttle: Introduction, Historical background, Development of shuttle system, Orbiter development, Current shuttle vehicle and operations, Shuttle evolution and future growth,

UNIT-III: **EXPENDABLE SPACE TRANSPORTATION SYSTEMS AND REUSABLE SPACE LAUNCH VEHICLES**

Introduction, Expendable launch vehicle design, History behind existing Expendable Launch Vehicles, Evolving the expendable launch vehicle, Reusable space launch vehicles: Background—Previous efforts at hypersonic flight, Early aerospace plane conceptual studies, The X-series of research aircraft, Challenges facing manned aerospace planes, Manned reusable systems development programs-Past and Ongoing., NASA reusable launch vehicle studies in 1990s., Hypersonic waveriders, Importance of vehicle health management, Future reusable space launch vehicles

OPERATIONS AND SUPPORT SYSTEMS

Introduction, Launch operations definition, Shuttle mission operations, Facility requirements for launch operations, Obstacles to streamlining launch operations, Evolutionary launch operations strategies, Designing for future expendable launch vehicle launch operations, Improving Existing Launch Operations, Future launch operations

UNIT IV: SYSTEMS AND MULTIDISCIPLINARY DESIGN OPTIMIZATION

Introduction, Launch vehicle conceptual design problem, Modeling needs, Optimization strategies and applications, Collaborative work environment of the future

SYSTEMS TECHNOLOGY DEVELOPMENT

Introduction, Vehicle technologies, Propulsion technologies, Ground and mission operations technologies, Assessing technological options, Technology transfer and commercialization, Applying a commercial development process for access to space

UNIT V: PROGRAM PLANNING, MANAGEMENT, AND EVALUATION

Introduction, Management Trends, Good Project Management as Team Building and a Balancing Act,

Types of Project Management, Configuration Management, Risk Management, Earned value management, Total Quality Management, Managing ultra-large projects

FUTURE SYSTEMS

Introduction, Next generation space transportation systems, Accelerator concepts, nuclear fission and fusion based concepts, Antimatter-based propulsion concepts, Solar propulsion concepts, Laser and beamed energy propulsion Concepts, Magnetic Monopoles Concept, Field and Quantum Effect Propulsion Concepts.

Text Book

1. ***S****pace Transportation: A Systems Approach to Analysis and Design****,*** Walter Hammond, AIAA Education Series, American Institute of Aeronautics and Astronautics, Inc, 1999.

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(R18D7618) AEROELASTICITY

(ELECTIVE-IV)

UNIT-I : AEROELASTIC PHENOMENA

Stability versus response problems; The aeroelastic triangle of forces; Aero elasticity in Aircraft Design; Prevention of aero elastic instabilities. Influence and stiffness coefficients. Coupled oscillations.

UNIT-II: DIVERGENCE OF A LIFTING SURFACE

Simple two dimensional idealizations; Strip theory, Integral equation of the second kind Exact solutions for simple rectangular wings, Semirigid" assumption and approximate solutions; Generalized coordinates, successive approximations, numerical approximations using matrix equations.

UNIT-III : STEADY STATE AEROLASTIC PROBLEMS

Loss and reversal of aileron control, critical aileron reversal speed, aileron efficiency, semi rigid theory and successive approximations, lift distribution, rigid and elastic wings.
Tail efficiency, effect of elastic deformation on static longitudinal stability.

UNIT-IV: FLUTTER PHENOMENON

Non-dimensional parameters, stiffness criteria, dynamic mass balancing, dimensional similarity; Flutter analysis, two dimensional thin airfoils in steady incompressible flow, quasi steady aerodynamic derivatives; Galerkin method for critical flutter speed, stability of disturbed motion, solution of the flutter determinant, methods of determining the critical flutter speeds, flutter prevention and control.

UNIT-V : EXAMPLES OF AEROELASTIC PROBLEMS

Galloping of transmission lines and Flow induced vibrations of transmission lines, tall slender structures and suspension bridges.

Text Books:

1. Y.C.Fung, “An Introduction to the Theory of Aero elasticity”, John Wiley & Sons Inc., New York, 2008.
2. E.G. Broadbent, “Elementary Theory of Aero elasticity”, Bun Hill Publications Ltd., 1986.

Reference Books:

1. R.L. Bisplinghoff, H.Ashley, and R.L. Halfmann, “Aero elasticity”, Edition Addison Wesley Publishing Co., Inc., 2nd Edition, 1996.
2. R.H. Scanlan and R. Rosenbaum, “Introduction to the study of Aircraft Vibration and Flutter”, Macmillan Co., New York,1981.
3. R. D. Blevins, “Flow Induced Vibrations”, Krieger Pub Co.,2001

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(R18DME54) COMPOSITE MATERIALS
(OPEN ELECTIVE –II)

Objectives:
- To be familiar with classification and characteristics of composite material and their applications.
- To gain the knowledge about manufacturing methods of composites .
- To know the testing methods related to composite materials.

UNIT-I
Introduction: Definitions, Composites, Reinforcements and matrices, Types of reinforcements, Types of matrices, Types of composites, Carbon Fibre composites, Properties of composites in comparison with standard materials, Applications of metal, ceramic and polymer matrix composites.

UNIT-II
Manufacturing methods: Hand and spray lay - up, injection molding, resin injection, filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.

UNIT-III
Mechanical Properties -Stiffness and Strength: Geometrical aspects – volume and weight fraction. Unidirectional continuous fibre, discontinuous fibers, Short fiber systems, woven reinforcements – Mechanical Testing: Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.

UNIT-IV
Laminates: Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Plate Stiffness and Compliance, Computation of Stresses, Types of Laminates -, Symmetric Laminates, Anti-symmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Cross-ply Laminate, Angle-ply Laminate. Orthotropic Laminate, Laminate Moduli, Hygrothermal Stresses.

UNIT-V
Joining Methods and Failure Theories: Joining –Advantages and disadvantages of adhesive and mechanically fastened joints. Typical bond strengths and test procedures.

TEXT BOOKS:
1. K.K. Chawla, (1998), Composite Materials, Springer-Verlag, New York
2. B.T. Astrom, (1997), Manufacturing of Polymer Composites, Chapman & Hall
3. Composite materials by J.N.Reddy

REFERENCE BOOKS:
1. Stuart M Lee, J. Ian Gray, Miltz, (1989), Reference Book for Composites Technology, CRC press
2. Frank L Matthews and R D Rawlings, (2006), Composite Materials: Engineering and Science, Taylor and Francis.
3. D. Hull and T.W. Clyne, (1996), Introduction to Composite Materials, Cambridge University Press
4. Analysis and Performance of Fiber Composites by Bhagwan D. Agarwal
5. Mechanics of Composite Materials by Autar K. Kaw

OUTCOMES:

- To provide knowledge on characteristics of composites
- To get knowledge on manufacturing and testing methods and mechanical behavior
- of composites.
- To get the exposure of different materials.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

	L	T/P/D	C
I Year M. Tech, ASP-II SEM			
(R18DME55) WASTE TO ENERGY	**3**	**-**	**3**
(OPEN ELECTIVE –II)			

Prerequisite: Renewable Energy Sources, Physics, Environmental Studies

Course Objectives:

- To classify solid waste sources
- To identify methods of solid waste disposal
- To study various energy generation methods
- To analyse biogas production methods and recycling of e-waste

Course Outcomes: Upon the completion of the subject, the student will be able to

- Understand technologies for generation of energy from solid waste
- Compare methods of solid waste disposal
- Identify sources of energy from bio-chemical conversion
- Analyze methods for management of e-waste

UNIT- I :Solid Waste Sources Solid Waste Sources, types, composition, Properties, Global warming, Municipal Solid Waste: Physical, chemical and biological properties , Waste Collection and, Transfer stations, Waste minimization and recycling of municipal waste, Segregation of waste, Size Reduction , Managing Waste. Status of technologies for generation of Energy from Waste Treatment and Disposal Aerobic composting, incineration, Furnace type and design, Medical waste /Pharmaceutical waste treatment Technologies, incineration, Environmental impacts, Measures to mitigate environmental effects due to incineration .

UNIT – II: Land Fill method of Solid waste disposal Land fill classification, Types, methods and Sitting consideration, Layout and preliminary design of landfills: Composition, characteristics, generation, Movement and control of landfill leach ate and gases, Environmental monitoring system for land fill gases.

UNIT – III: Energy Generation from Waste Bio-chemical Conversion: Sources of energy generation, anaerobic digestion of sewage and municipal wastes, direct combustion of MSW-refuse derived solid fuel, Industrial waste, agro residues, Anaerobic Digestion.

UNIT – IV: Biogas production, Land fill gas generation and utilization, Thermo-chemical conversion: Sources of energy generation, Gasification of waste using Gasifiers, Briquetting, Utilization and advantages of briquetting, Environmental benefits of Bio-chemical and Thermo- chemical conversion.

UNIT – V: E-waste: e-waste in the global context – Growth of Electrical and Electronics Industry in India – Environmental concerns and health hazards – Recycling e-waste: a thriving economy of the unorganized sector – Global trade in hazardous waste – impact of hazardous e-waste in India. Management of e-waste: e-waste legislation, Government regulations on e-waste management – International experience – need for stringent health safeguards and environmental protection laws of India.

TEXT BOOKS:

1. Nicholas P. Cheremisinoff. Handbook of Solid Waste Management and Waste Minimization Technologies. An Imprint of Elsevier, New Delhi (2003).

2. P. Aarne Vesilind, William A. Worrell and Debra R. Reinhart. Solid Waste Engineering. Thomson Asia Pte Ltd. Singapore (2002)
3. M. Dutta , B. P. Parida, B. K. Guha and T. R. Surkrishnan. Industrial Solid Waste Management and Landfilling practice. Narosa Publishing House, New Delhi (1999).
4. “E-waste in India: Research unit, Rajya Sabha Secretariat, New Delhi, June 2011”
5. Amalendu Bagchi. Design, construction and Monitoring of Landfills. John Wiley and Sons. New York. (1994)
6. M. L. Davis and D. A. Cornwell. Introduction to environmental engineering. Mc Graw Hill International Edition, Singapore (2008)
7. C. S. Rao. Environmental Pollution Control Engineering. Wiley Eastern Ltd. New Delhi (1995)
8. S. K. Agarwal. Industrial Environment Assessment and Strategy. APH Publishing Corporation. New Delhi (!996)
9. Sofer, Samir S. (ed.), Zaborsky, R. (ed.), “Biomass Conversion Processes for Energy and Fuels”, New York, Plenum Press, 1981
10. Hagerty, D.Joseph; Pavoni, Joseph L; Heer, John E., “Solid Waste Management”, New York, Van Nostrand, 1973
11. George Tchobanoglous, Hilary Theisen and Samuel Vigil Prsl: Tchobanoglous, George Theisen, Hillary Vigil, Samuel, “Integrated Solid Waste management: Engineering Principles and Management issues”, New York, McGraw Hill, 1993.

REFERENCES:

- C Parker and T Roberts (Ed), Energy from Waste – An Evaluation of Conversion Technologies, Elsevier Applied Science, London, 1985
- KL Shah, Basics of Solid and Hazardous Waste Management Technology, Prentice Hall, 2000 3. M Datta, Waste Disposal in Engineered Landfills, Narosa Publishing House, 1997
- G Rich et.al, Hazardous Waste Management Technology, Podvan Publishers, 1987
- AD Bhide, BB Sundaresan, Solid Waste Management in Developing Countries, INSDOC, New Delhi,1983 FUEL CELL AND

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(R18DME56) INDUSTRIAL MANAGEMENT
(OPEN ELECTIVE-II)

Objectives:

- This course is intended to familiarise the students with the framework for the managers and leaders
- The student able to understanding and making decisions realting to issues related organiational structure, production operations, marketing
- The student learn about Human resource Management, product management and strategy.

UNIT- I

Concepts of Management and Organisation - Functions of Management - Evolution of Management Thought : Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc-Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Hertzberg's Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs - Systems Approach to Management.

UNIT –II

Designing Organisational Structures : Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT –III

Plant location, definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant- Matrix approach. Plant Layout - definition, objectives, types of production, types of plant layout - various data analyzing forms-travel chart.

Work study - Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts-difference between micromotion and memomotion studies. Work measurement-definition,time study, steps involved-equipment, different methods of performance rating- allowances, standard time calculation. Work Sampling - definition, steps involved, standard time calculations, differences with time study.

UNIT –IV

Materials Management-Objectives, Inventory - functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems-Continuous review system-periodical review system. Stores Management and Stores Records. Purchase management, duties of purchase of manager,associated forms.Introduction to PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times estimation-programme evaluation review techniques-Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT –V

Inspection and quality control, types of inspections - Statistical Quality Control-techniques-variables and attributes-assignable and non assignable causes- variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Introduction to TQM-Quality Circles, ISO 9000 series procedures. Introduction to Human Resource Management, Functions of HRM, Job Evaluation, different types of evaluation methods. Job description, Merit Rating.- difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs selling, marketing mix, product lifecycle.

TEXT BOOKS:

1. Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition, 2004.
2. Industrial Engineering and Management O.P. Khanna Dhanpat Rai.
3. A.R.Aryasri, Management Science , Tata McGraw-Hill, 2002.

REFERENCE BOOKS:

1. Panner Selvam, Production and Operations Management, PHI, 2004.
2. Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy, Reliability Engineering & Quality Engineering, Galgotia Publications, Pvt., Limited.
3. Phillip Kotler, Marketing Management, Pearson, 2004.

Outcomes:

- Plan an organizational structure for a given context in the organisation carry out production operations through Work study and carry out production operations through Work study.
- understand the markets, customers and competetion better and price the given products appropriately and ensure quality for a given product or service.
- plan and control the HR function better and plan, schedule and control projects through PERT and CPM ,evolve a strategy for a business or service organisation.

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(R18DHS52) COST MANAGEMENT OF ENGINEERING PROJECTS
(OPEN ELECTIVE –II)

Course Objective:

- Project Cost management is concerned with the process of planning and controlling the budget of a project or business.
- The Cost Management course addresses activities such as planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.

Course Outcome:

- The student is able to understand the detailed cost concepts, cost structure and elements of costs of manufacturing and service organizations.
- To learn the reporting system of the organisation for effective decision making, planning, evaluation and control.

Unit-I: Introduction to Project Cost Management: Concept of project cost management - objectives and scope- Elements of project costs: functional classification and ascertainment of cost (material, labour and overhead costs) –Preparation of a cost sheet for an engineering project

Unit-II: Method of Project Costing: Single Output/ Unit Costing: Activity Based Costing - Job Costing - Batch Costing - Contract Costing - Process/ Operation Costing

Unit-III: Marginal Cost: Marginal Costing – Nature and Scope- Applications - Break even charts and Point, Decision Making (all types with full problems) Differential Cost Analysis, Advantages and Disadvantages of Marginal Costing.

Unit-IV: Project Budgetary Control: Objectives of Project Budgetary control - Functional Project Budgets - Master Budgets - Key Factor Problems on Production Budgets and Flexible Budgets. Standard Costing- Comparison with Budgetary control, analysis of Variances, Simple Problems on Material and Labour variances only.

Unit-V: Project Cost Audit & Reporting to Management: Objectives and advantages of Project Cost Audit – Project Cost Audit report - Management Audit - Objectives and Scope. Reporting to Management – Purpose of reporting- Requisites of a good report, Classifications of Report, Segment reporting

Reference Books

- Project Estimating and Cost Management, Project Management Essential Library, Berrett-Koehler Publishers (October 1, 2001)
- Project Management Accounting,: Budgeting, Tracking, and Reporting Costs and Profitability, Wiley; 2 edition (June 28, 2011) by Kevin R. Callahan, Gary S. Stetz , Lynne M. Brooks
- Cost and Management Accounting 2014, by S.P. Jain & K.L. Narang
- Cost and Management Accounting, New Age International by M.E. Thukaram Rao
- Advanced Cost & Management Accounting – Problems & Solutions, Prentice Hall of India (P) Ltd. by V.K. Saxena & C.D. Vashist
- Studies in Cost Management, Sultan Chand & Sons by S.N. Maheshwari

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I Year M. Tech, ASP-II SEM			
(R18DCS52) INFORMATION SECURITY (OPEN ELECTIVE II)	**3**	**-**	**3**

Objective:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.
Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP)
IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security: Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security: Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.

3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.

4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

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(R18DAE52) UNMANNED AERIAL VEHICLES

UNIT-I: INTRODUCTION TO UNMANNED AIRCRAFT SYSTEMS
Applications of UAS, categories of UAV systems, roles of unmanned aircraft, composition of UAV system.

UNIT-II: DESIGN OF UAV SYSTEMS-I
Introduction to design and selection of the systems-conceptual phase, preliminary design, detailed design; Aerodynamics and airframe configurations-Lift-induced Drag, Parasitic Drag, Rotary-wing Aerodynamics, Response to Air Turbulence, Airframe Configurations; Medium-range, Tactical Aircraft, Characteristics of Aircraft Types-Long-endurance, Long-range Role Aircraft, Medium-range, Tactical Aircraft, Close-range/Battlefield Aircraft, MUAV Types, MAV and NAV Types, UCAV, Novel Hybrid Aircraft Configurations, Aspects of Airframe Design: Scale Effects, Packaging Density, Aerodynamics, Structures and Mechanisms, Selection of power- plants, Modular Construction, Ancillary Equipment, Design for Stealth: Acoustic Signature, Visual Signature, Thermal Signature, Radio/Radar Signature, Payload Types: Non-dispensable and dispensablepayloads.

UNIT-III: DESIGN OF UAV SYSTEMS-II
Communications-Communication Media, Radio Communication, Mid-air Collision (MAC) Avoidance, Communications Data Rate and Bandwidth Usage, Antenna Type; Control and Stability: HTOL Aircraft, Convertible Rotor Aircraft, Payload Control, Sensors, Autonomy; Navigation: NAVSTAR Global Positioning System (GPS), TACAN, LORAN C, Inertial Navigation, Radio Tracking, Way-point Navigation; Launch and Recovery.

Design for Reliability: Determination of the Required Level of Reliability, Achieving Reliability,
Reliability Data Presentation, Multiplexed Systems, Reliability by Design, Design for Ease of Maintenance; Design for Manufacture and Development

UNIT-IV: THE DEVELOPMENT OF UAV SYSTEMS
System Development and Certification-System Development, Certification, Establishing Reliability; System Ground Testing: UAV Component Testing, UAV Sub- assembly and Sub-system Testing, Testing Complete UAV, Control Station Testing , Catapult Launch System Tests, Documentation; System In- flight Testing: Test Sites, Preparation for In-flight Testing, In- flight Testing, System certification.

UNIT-V: DEPLOYMENT AND FUTURE OF UAV SYSTEMS
Operational trials and full certification; UAV System Deployment- Network-centric Operations (NCO), Teaming with Manned and Other Unmanned System; Naval, arm and air force roles, civilian, paramilitary and commercial roles.

Text Books:
1. Reg Austin, Wiley, “Unmanned Aircraft Systems, UAVS Design and Deployment”, 2nd Edition, 2010.

Reference Books:
1. Richard K. Barnhart, Stephen B. Hottman, Douglas M. Marshall, Eric Shappee, (eds.), “Introduction to Unmanned Aircraft Systems”, CRC Press, 2012.

2. Valavanis, Kimon P., Vachtsevanos, George J. “Handbook of Unmanned Aerial Vehicles” AIAA series, 3rd Edition, 2004.

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I Year M. Tech, ASP-II SEM

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(R18DEC52) RESEARCH METHODOLOGY
(OPEN ELECTIVE – II)

UNIT - I

Introduction: Research objective and motivation, Types of research, Research approaches, Significance, Research method vs. methodology, Research process.

UNIT - II

Formulating a research problem: Literature review, Formulation of objectives, Establishing Operational definitions, Identifying variables, constructing hypotheses.

UNIT - III

Research design and Data Collection: Need and Characteristics, Types of research design, Principles of Experimental research design, Method of data collection, Ethical issues in collecting data.

UNIT - IV

Sampling and Analysis of data: Need of Sampling, Sampling distributions, Central limit theorem, Estimation: mean and variance, Selection of sample size Statistics in research, Measures of Central tendency, Dispersion, asymmetry and relationships, Correlation and Regression analysis, Displaying data

UNIT - V

Hypothesis Testing: Procedure, Hypothesis testing for difference in mean, variance limitations, Chi- square test, Analysis of variance (ANOVA), Basic principles and techniques of writing a Research Proposal

Text Books:

1. R. C. Kothari, Research Methodology: Methods and Techniques, 2nd edition, New Age International Publisher, 2009
2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition, SAGE, 2005

References:

1. Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/>
2. (Electronic Version): StatSoft, Inc. (2012). Electronic Statistics Textbook. Tulsa, OK: StatSoft. WEB: http://www.statsoft.com/textbook/.(Printed Version): Hill, T. & Lewicki, P. (2007). STATISTICS: Methods and Applications. StatSoft, Tulsa, OK.

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I Year M. Tech, ASP-II SEM

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0	3	2

(R18D7683) DIGITAL SIMULATION LAB-II

I SOFTWARE DEVELOPMENT FOR THE FOLLOWING USING FINITE ELEMENT METHODS

Thin walled beams Plate bending Beams analysis Trusses analysis Thin shells analysis

II AEROSPACE STRUCTURAL ANALYSIS USING ANSYS

Structural analysis of aircraft wing
Structural analysis of aircraft wing (Composite material) Analysis of fuselage
Analysis of landing gear
Structural and thermal analysis of exposed surface of space shuttle using FGM material
Fractural mechanics of crack propagation of thin panel

III. SIMULATION EXPERIMENTS IN DYNAMICS AND CONTROL USING MATLAB AND SIMULINK

Simulation of Aircraft motion-longitudinal dynamics, lateral dynamics
Six-degrees-of-freedom simulation of aircraft motion with illustration of F-16 model

REFERENCES

1. Engineering Analysis with ANSYS Software, Y. Nakasone, S.Yoshimoto, T. A. Stolarski, Elsevier Publication, 2006
2. Atmospheric and Space Flight Dynamics, Ashish Tewari, Birkhauser Publication, 2007
Modern Control Design with MATLAB and Simulink, A. Tewari

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I Year M. Tech, ASP-II SEM	L	T/P/D	C
(R18DHS56) ENGLISH FOR RESEARCH PAPER WRITING (AUDIT COURSE –II)	2	-	

INTRODUCTION

Writing a research paper is a significant part of any academia. It is a substantial piece of academic writing in which the author does independent investigation into a topic and writes a description of the findings of that study. Research studies are important because these contribute to a scholar's knowledge and also provides solutions to the latest challenges. Writing forces one to think about what he believes and what he wants to communicate. Since good writing skills allow a learner to communicate his message with clarity, an extensive exposure on techniques of writing research paper proves to be an immense value to the students .

OBJECTIVES

1. To enable the students to use linguistic structures to form well-organized texts in research contexts
2. To improve the quality of a composition by using appropriate cohesive devices
3. To enhance the mechanics of writing skills using correct grammar and vocabulary
4. To equip learners with the strategies of error – free writing

SYLLABUS

Unit 1 - Sentence Formation
Word order, Structuring paragraphs, Breaking up long sentences

Unit 2 - Cohesive devices
Types of cohesive devices - Anaphoric reference, Cataphoric reference, Exophoric reference
Tense agreement

Unit 3 – Academic Vocabulary
Hedging, Transitions – Additive, Adversative, Causal, Sequential

Unit 4– Grammar for Research Papers
Active & Passive, Punctuation, Articles

Unit 5 – Academic writing
Removing redundancy, Avoiding ambiguity, Paraphrasing, Sample Abstracts for practice, Sample videos

* Exercises apart from the text book shall also be referred for classroom tasks.

REFERENCE BOOKS:

1. English for Writing Research Papers. Adrian Wallwork, edition II, Springer, 2016.
2. Handbook of Technical Writing. James H. Shelton, McGraw Hill, 1994
3. Writing the Research Paper, a handbook. 8th edition, Anthony C. Winkler, Jo Ray Metherell, Wadsworth, 2012

OUTCOMES:

Students will be able to:

1. Write in a clear, coherent, and direct style appropriate for academic research
2. Draft coherent and unified paragraphs with adequate supporting details.
3. Develop the strategy to use lexical terms effectively.
4. Adopt appropriate syntactic and semantic techniques
5. Demonstrate analytical and inferencing skills.
6. Comprehend and employ the various forms of scholarly composition.

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(R18D7683) SEMINAR-I

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L	T/P/D	C
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(R18D7691) Mini Project

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(R18D7692) Project Review-I

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(R18D7684) Seminar-II

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(R18D7693) Project Review-II

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(R18D7694) Project Viva-voce