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
ELECTRONICS & COMMUNICATION ENGINEERING

Course Structure & Syllabus
(Batches admitted from the academic year 2015 - 2016)

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:
  - 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 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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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

COURSE STRUCTURE

I Year B. Tech (ECE) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX.MARKS	
						Int	Ext
1	R15A0001	ENGLISH	3		2	25	75
2	R15A0021	MATHEMATICS-1	5		4	25	75
3	R15A0011	ENGINEERING PHYSICS-1	3	1	2	25	75
4	R15A0013	ENGINEERING CHEMISTRY	4		3	25	75
5	R15A0501	COMPUTER PROGRAMMING WITH C	4	1	3	25	75
6	R15A0302	ENGINEERING DRAWING	2	3	4	25	75
7	R15A0581	COMPUTER PROGRAMMING LAB	-	3	2	25	50
8	R15A0083	ENGINEERING PHYSICS & CHEMISTRY LAB	-	3	2	25	50
9	R15A0081	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-I	-	3	2	25	50
		TOTAL	21	14	24	225	600

I Year B. Tech (ECE) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX.MARKS	
						Int	Ext
1	R15A0002	PROFESSIONAL ENGLISH	3		2	25	75
2	R15A0022	MATHEMATICS-II	5	-	4	25	75
3	R15A0012	ENGINEERING PHYSICS-II	3	1	2	25	75
4	R15A0502	OBJECT ORIENTED PROGRAMMING	4	1	3	25	75
5	R15A0201	ELECTRICAL CIRCUITS	5	-	4	25	75
6	R15A0014	ENVIRONMENTAL STUDIES	4	-	3	25	75
7	R15A0582	OBJECT ORIENTED PROGRAMMING LAB	-	3	2	25	50
8	R15A0084	IT WORKSHOP/ENGINEERING WORKSHOP	-	3	2	25	50
9	R15A0082	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-2	-	3	2	25	50
*10	R15A0003	HUMAN VALUES AND SOCIETAL PERSPECTIVES	2	-	-	50	-
		TOTAL	26	11	24	275	600

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

II Year B. Tech (ECE) – I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R15A0023	Mathematics-III	4	1	3	25	75
2	R15A0401	Electronic Devices and Circuits	5	-	4	25	75
3	R15A0402	Signals and Systems	4	1	3	25	75
4	R15A0403	Probability Theory and stochastic Process	4	1	3	25	75
5	R15A0202	Electrical Technology	5	-	4	25	75
6	R15A0061 R15A0066 R15A0067	Open Elective 1 1. Managerial Economics and Financial Analysis 2. Disaster Management 3. Technology Management	4	-	3	25	75
7	R15A0481	Electronic Devices & Circuits Lab	-	3	2	25	50
8	R15A0482	Basic Simulation Lab	-	3	2	25	50
*9	R15A0004 R15A0005	Foreign Language: French Foreign Language: German	2	-	-	50	-
Total			28	09	24	250	550

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

II Year B. Tech (ECE) – II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R15A0203	Control Systems	4	1	3	25	75
2	R15A0404	Pulse and Digital Circuits	4	1	3	25	75
3	R15A0405	Electronic Circuit Analysis	4	1	3	25	75
4	R15A0406	Electromagnetic Theory and Transmission Lines	4	1	3	25	75
5	R15A0407	Switching Theory and Logic Design	4	1	3	25	75
6	R15A0064 R15A0069 R15A0065	Open Elective 2: 1. Enterprise Resource Planning 2. Intellectual Property Rights 3. Management Science	4	-	3	25	75
7	R15A0483	EC& PC Lab	-	3	2	25	50
8	R15A0281	Electrical Technology Lab	-	3	2	25	50
9	R15A0006	Gender Sensitization	-	3	2		
Total			24	14	24	250	550

III Year B. Tech (ECE) – I Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R15A0408	IC Applications	5	-	4	25	75
2	R15A0409	Analog Communications	5	-	4	25	75
3	R15A0569	Computer Organization & Operating Systems	4	1	3	25	75
4	R15A0410	Digital Design Through Verilog	4	1	3	25	75
5	R15A0411 R15A0412 R15A0204	Core Elective 1 1. Digital System Design 2. Design of Fault Tolerance Systems 3. Digital Control Systems	4	1	3	25	75
6	R15A0507 R15A0520 R15A0536	Open Elective 3 1. Java Programming 2. Web Technologies 3. Artificial Intelligence	4	1	3	25	75
7	R15A0484	IC Applications & HDL Simulation Lab	-	3	2	25	50
8	R15A0485	Analog Communications Lab	-	3	2	25	50
*9	R15A0007	Technical Communications and Soft Skills	2	-	-	50	-
Total			24	09	24	250	550

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

III Year B. Tech (ECE) – II Semester

S.NO.	SUBJECT CODE	SUBJECT	L	T/P/D	C	MAX MARKS	
						INT	EXT
1	R15A0413	Digital Communications	4	1	3	25	75
2	R15A0414	Microprocessors and Microcontrollers	5	-	4	25	75
3	R15A0415	Digital Signal Processing	5	-	4	25	75
4	R15A0416	Antennas and Wave Propagation	4	1	3	25	75
4	R15A0417 R15A0418 R15A0419	Core Elective 2 1. Electronic Measurements & Instruments 2. Optical Communications 3. Data Communications	4	1	3	25	75
6	R15A0509 R15A0543 R15A0568	Open Elective 4 1. Data Base Management System 2. Software Project Management 3. Apps Design & Development	4	1	3	25	75
7	R15A0486	Microprocessors and Microcontrollers Lab	-	3	2	25	50
8	R15A0487	Digital Signal Processing Lab	-	3	2	25	50
Total			20	12	24	200	550

IV Year B. Tech (ECE) – I Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max. Marks	
						Int	Ext
1	R15A0420	VLSI Design	5	-	4	25	75
2	R15A0421	Microwave Engineering	5	-	4	25	75
3	R15A0422	Cellular & Mobile Communications	4	1	3	25	75
4	R15A0514	Computer Networks	4	1	3	25	75
4	R15A0423 R15A0424 R15A0425	Core Elective 3 1. Satellite Communications 2. Embedded Systems Design 3. Television Engineering	4	1	3	25	75
5	R15A0426 R15A0427 R15A0428	Core Elective 4 1. Digital Image Processing 2. Speech Processing 3. Multimedia & Signal Coding	4	1	3	25	75
7	R15A0488	eCAD & VLSI Lab	-	3	2	25	50
8	R15A0489	Microwave Engineering & Digital Communications Lab	-	3	2	25	50
Total			26	10	24	200	550

IV Year B. Tech (ECE) – II Semester

S.No.	Subject Code	SUBJECT	L	T/P/D	C	Max. Marks	
						Int	Ext
1	R15A0429 R15A0430 R15A0431	Core Elective 5 1. Radar Systems 2. Digital Signal Processors & Architectures 3. RF Circuit Design	5	-	4	25	75
2	R15A0432 R15A0573 R15A0433	Core Elective 6 1. Wireless Communications & Networks 2. Network Security & Cryptography 3. Telecommunication Switching Systems & Networks	5	-	4	25	75
3	R15A0490	Mini Project	-	-	4	-	100
4	R15A0491	Technical Seminar	-	6	2	50	-
5	R15A0492	Major Project	15	-	10	100	200
Total			25	6	24	200	450

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech ECE-I Sem	**L**	**T/P/D**	**C**
	3	**-/-/-**	**2**

(R15A0001) ENGLISH

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Objectives:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
3. To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.

1. Listening for general content
2. Listening to fill up information
3. Intensive listening

4. Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
3. Oral practice
4. Describing objects/situations/people
5. Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English : A Communicative Approach)
6. Just A Minute (JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the
3. overall message of the text, draw inferences etc.
4. Skimming the text
5. Understanding the gist of an argument
6. Identifying the topic sentence
7. Inferring lexical and contextual meaning
8. Understanding discourse features
9. Scanning the text
10. Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
3. Writing sentences
4. Use of appropriate vocabulary
5. Paragraph writing

1. Coherence and cohesiveness
2. Narration / description
3. Note Making
4. Formal and informal letter writing
5. Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units are prescribed in each semester:

For Detailed study

First text book entitled "Skills Annexe: Functional English for Success", published by Orient BlackSwan, Hyderabad.

For Non-detailed study

Second textbook titled "Epitome of Wisdom", published by Maruthi Publications, Guntur.

Unit –I:

1. Chapter entitled 'Mokshagundam Visvesvaraya' from *Epitome of Wisdom*, published by Maruthi Publications, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Jam session
R- Reading – The Palm Islands
W- Writing – Writing Paragraphs
G- Grammar – Conjunctions and Adverbs

V- Vocabulary – Prefixes and Suffixes

Unit – II

1. Chapter entitled "Never Never Nest" by Cedric Mount, published in *Ten One Act Plays, 1937*, Willett, Clark and Company, 1937.

L- Listening – Project Based Assignment
S- Speaking – Role plays—Introduction, Greetings, Requests, Permission
R- Reading – Reading for the plot
W- Writing – Note writing
G- Grammar – Articles, Finite and Non-finite Verbs, Auxiliary Verbs and Nouns
V- Vocabulary – Homophones, Homographs and Homonyms

Unit – III

1. Chapter entitled "Risk Management" from *Skills Annexe -Functional English for Success*, published by Orient Black Swan, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Role plays – Refusal, Apology, and Complimenting
R- Reading – Shivakasi Accident

W- Writing – Note Making and Note Taking
G- Grammar – Tenses and Punctuation
V- Vocabulary – Synonyms and Antonyms

Unit – IV

1. Chapter entitled 'Leela's Friend' from *Epitome of Wisdom*, published by Maruthi Publications, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Role plays—Congratulating, Consolation, and Social Etiquettes
R- Reading – Forensic Science
W- Writing – Letter Writing
G- Grammar – Contractions, Questions, Prepositions
V- Vocabulary – Phrasal Verbs

Unit –V

1. Chapter entitled "Three Days to See" from *Epitome of Wisdom*, published by Maruthi Publications, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Professional and Telephone Etiquettes
R- Reading – Reading for Facts
W- Writing – Business Letters, Complaints, Apologies, Requests
G- Grammar – Correction of Sentences and Modal Auxiliaries
V- Vocabulary – Confused Words

* Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw – Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.

16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publish.

Outcomes:

1. Usage of English Language, written and spoken.
2. Enrichment of comprehension and fluency.
3. Gaining confidence in using language in verbal situation.

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I Year B. Tech ECE -I Sem	**L**	**T/P/D**	**C**
	5	**1/ -/-**	**4**

(R15A0021) MATHEMATICS – I

Objectives:

To learn

1. Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions if exist and concept of eigen values and eigen vectors of a matrix
2. The mean value theorems and to understand the concepts geometrically , functions of several variables and optimization of these functions.
3. Methods of solving the differential equations of 1^{st} and higher order cooling, Natural growth and decay, bending of beams etc.
4. Properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem

UNIT - I: Matrix Theory

Introduction to matrices- Elementary row and column operations on a matrix- Finding rank of a matrix by reducing to Echelon and Normal forms-Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix-Cayley - Hamilton Theorem (without proof) – Verification- finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem- Linear dependence and Independence of Vectors-Eigen values and eigen vectors of a matrix-Properties of eigen values and eigen vectors of real and complex matrices,Diagonalisation of matrix.

UNIT – II: Differential Calculus

Mean Value Theorms: Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorems with geometrical interpretations (all theorems without proof)- verification of the Theorems and testing the applicability of these theorems to the given function-Taylor's series -Maclaurin's series.

Functions of Several Variables: Jacobian-Functional dependence- Maxima and Minima of functions of two variables without constraints and with constraints - Method of Lagrange multipliers.

UNIT – III: Ordinary Differential Equations of First Order and Applications

Formation of differential equation- Solution of D.E - Variable Separable form-Homogeneous-Non homogeneous- Exact-Non Exact-Linear and Bernoulli's equations-Applications of first order differential equations – Newton's Law of cooling- Law of natural growth and decay- Orthogonal trajectories

UNIT - IV: Linear Differential Equations of Higher Order and Applications

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-Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V Laplace Transforms and Applications

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 – second shifting theorem – Dirac's delta 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. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.

2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.

Outcomes:

1. After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
2. The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
3. The student is able to identify the type of differential equation and uses the tight method to solve the differential equations. Also able to apply the theory of differential equations to the real world problems.
4. The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech ECE -I Sem	**L**	**T/P/D**	**C**
	3	**- / - / -**	**2**

(R15A0011) ENGINEERING PHYSICS – I

OBJECTIVES:

The objectives of Engineering Physics are

1. To understand wave nature of light in designing powerful light sources for various Engineering applications and enable them to develop communication systems by understanding the working of laser beams as well as Fiber Technology.
2. To understand the behavior of electron in a solids and classification of solids based on band theory thereby one can realize conductivity and specific heat values of solids.

To understand the basics of working and design of semiconductor devices.

UNIT-I

OPTICS: Introduction to Interference-Coherence-Coherent sources. Theory of interference fringes, Constructive and destructive interferences-Interference by division of wave front, Interference in thin films by reflected light, Interference due to division of amplitude-Newton's rings Experiment.

Diffraction-Frenel's diffraction, Fraunhoper's diffraction (Single Slit),Difference between interference and diffraction, Resolving Power of Grating.

Introduction to Polarization, representation of various polarized lights, Brewster law, and law of Mauls.

UNIT-II

LASERS: Characteristics of lasers, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, pumping, lasing action, Construction and working of Ruby Laser, Helium-Neon Laser, semi conductor lasers. Applications of lasers.

FIBER OPTICS: Advantages of optical fibers over conventional communication system, Construction and Working Principle of an optical fiber, Numerical aperture and Acceptance angle of an optical fiber, Mode and Propagation through step and graded index fibers, Attenuation, Applications of optical fibers.

UNIT-III

PRINCIPLES OF QUANTUM MECHANICS: Introduction-wave nature and particle nature-de Broglie's Hypothesis, Davisson and Germer's experiment, Matter Waves, Heisenberg's uncertainty principle. Physical significance of wave function, Schrodinger time-independent wave equation, Particle in One dimensional infinite potential box.

UNIT-IV

ELEMENTS OF STATISTICAL MECHANICS & BAND THEORY OF SOLIDS:

Introduction, Micro and Macro states, Maxwell Boltzman, Bose Einstein, Fermi Dirac Statistical distributions(Qualitative), Density of States, Fermi Energy, Introduction to electron theory of metals, Blotch Theorem (Qualitative), Khronig Penny model(Qualitative), EK curve-Effective mass of electron, Origin of energy bands in solids, Classification of solids-conductors, semi conductors and insulators with energy level diagrams.

UNIT-V

SEMICONDUCTOR PHYSICS: Types of semi conductors**,** Carrier concentration and Fermi level of intrinsic and Extrinsic Semiconductors, Direct and indirect band gaps of semi conductors. Hall Effect and features.

SEMICONDUCTOR DEVICES: Formation of PN junction diode, Energy level diagram of PN junction diode. I-V characteristics of PN junction diode-PN junction as half wave rectifier and full wave rectifier.PN junction diode as LED and Solar cell.

OUTCOMES:

1. The students would be able to learn the fundamental concepts of wave optics.
2. The knowledge on fundamentals of quantum mechanics, statistical mechanics enables the student to apply to various systems like communications solar cells, LED's and so on.
3. Finally, Engineering physics course helps the student to develop problem solving skills and analytical, practical skills

TEXT BOOKS:

1. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers
2. Engineering Physics, Dr Arumugam, Anuradha Publications

REFERENCES:

1. Text Book of Engineering Physics –P. G. Khirsagar, Avadhanulu– S. Chand
2. Engineering Physics ,P.K. Palaniswamy, Scitech Publishers
3. Solid State Physics, Kittel- Wiley International.
4. Solid State Physics – AJ DekKer-Macmillan Publishers.

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I Year B. Tech ECE -I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**3**

(R15A0013)ENGINEERING CHEMISTRY

Objectives

1. To impart the basic concepts and ideas in chemistry, to develop scientific attitudes and enable the students to correlate the concepts of chemistry with the core programmes.
2. Electrochemistry unit give conceptual knowledge about spontaneous processes and how can they be harnessed for producing electrical energy and efficiency of systems. Fuel cells which are the alternate energy sources for generating electrical energy on spot and portable applications.
3. Understand various techniques involved in polymerization and application of polymer technology in the area of various engineering fields and manufacturing process of important metallurgical materials.

UNIT I: Electrochemistry: Conductance - Specific, Equivalent, Molar conductance and their units. Applications of Conductance –Conductometric titrations (Acid base and Precipitation titrations); EMF-electrode and electrode potentials; Nernst equation and its applications; Electrochemical cells-Galvanic cell (Daniel cell) and Concentration cell (electrolytic concentration cell); Types of Electrodes–(construction and functioning of Calomel, Quinhydrone and glass electrodes); determination of P^H using glass electrode; Potentiometric titrations (Acid Base and Redox titrations); electrochemical series and its applications; Numerical problems.

Batteries: Primary (lithium cells) and secondary cells (Lead-Acid cell and Ni-Cd cell); **Fuel cells** - Hydrogen -Oxygen fuel cell- construction, functioning, advantages and applications.

Unit II: Corrosion and its Control: Causes and effects of corrosion; Theories of corrosion – Chemical corrosion (oxidation corrosion) & Electrochemicalcorrosion (mechanism of evolution of Hydrogen and Absorption of oxygen); Galvanic corrosion; Factors affecting rate of corrosion – Nature of metal (position of metal in galvanic series, overvoltage, relative areas of anodic and cathodic parts, purity of metal and passivity) and Nature of Environment (temperature, humidity and pH effect)

Corrosion control methods: Cathodic protection (Sacrificial Anodic and Impressed CurrentCathodic protection). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), cladding, electroplating (Cu plating) and Electroless plating (Ni plating) – advantages of electroless plating.

UNIT- III: Engineering Materials

Polymers: Classification of Polymers, Types of Polymerization (Chain growth, Step growth & Zeigler Natta) **Plastics:** Thermoplastic & Thermosetting resins, Preparation, properties,

engineering applications of PVC, Teflon and Bakelite. **Fibers-** Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers**–Natural rubber and its vulcanization.**Elastomers**–Buna-S, and Butyl rubber; **Conducting polymers:**Polyacetylene-Mechanism of conduction, doping; applications of conducting polymers; **Bio-degradable Polymers:**preparation and applications of Poly vinylacetate and Poly lactic acid.

Lubricants: Characteristics of a good lubricant; Classification with examples; properties of lubricants: viscosity, cloud point, pour point, flash and fire point.

Refractories: Classification of refractories with examples, characteristics of a good refractory and applications of refractories.

Nanomaterials: Introduction and applications of nanomaterials.

UNIT IV: Water and its Treatment:

Hardness of Water: Causes of hardness, types of hardness, units of hardness; determination of hardness of water by EDTA method - numerical problems. Boiler troubles – Scale &sludges, Priming, foaming, and caustic embrittlement; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and Calgon conditioning); External treatment– Zeolite process and Ion exchange process.**Potable Water**- Its Specifications–Disinfectation of water by ozonisation, chlorination (break point chlorination and its significance); Reverse Osmosis.

UNIT V: Fuels

Fuels – Characteristics of a good fuel, Classification – solid fuels: coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining; Cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Fischer-Tropsch‘s process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG; Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker‘s gas calorimeter.

TEXT BOOKS:

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company 14th Edition (2013)

REFERENCE BOOKS

1. Engineering Chemistry by BharathiKumari and JyotsnaCherukuri, VGS Techno Series (2013)
2. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi /CENGAGE learning (2013)

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(R15A0501) COMPUTER PROGRAMMING WITH C

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.
5. To introduce the students to basic data structures such as lists, stacks and queues.
6. To make the student understand simple sorting and searching methods

UNIT - I

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Life Cycle, Algorithm, Flowchart.

Introduction to C – History of C, Features Of C, Structure Of C Program, Character Set, C Tokens-keywords, Identifiers, Constants, Data types, Variables, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, Statements-Selection Statements(Decision Making) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, other statements related to looping –break, continue, goto.

UNIT-II

Functions-Designing Structured Programs, Types of Functions- user defined functions, Standard Functions, Inter function communication, Categories of functions ,Parameter Passing techniques, Scope, Storage classes-auto, register, static, extern, Type qualifiers, Recursion- recursive functions, Preprocessor commands.

UNIT – III

Arrays – Declaration and Initialization, Inter Function Communication, Array Applications, Two dimensional arrays, Multi dimensional arrays.

Strings – Declaration and Initialization, String Input / Output functions, Arrays of strings,

String manipulation functions.

UNIT-IV

Pointers- Introduction, Definition and uses of pointers, address operator, Pointer variables, Pointer constants ,dereferencing pointers, void pointers, Pointer arithmetic, Pointers to Pointers, Pointers and Arrays, Pointers and Functions, Pointers to functions, Array of pointers, Pointers and Strings.

UNIT-V

Structures and Unions - **I**ntroduction, Declaration and Initialization, Structure within a structure, Operations on structures, Array of Structures, Pointer to Structures, Structures and Functions, Self referential structures, Typedef, enum, bitfields, Unions.

Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions, File Status functions (Error handling), Positioning functions, Command line arguments.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Mastering C*, K.R.*Venugopal, S R Prasad, Tata McGraw-Hill Education.

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. Ability to apply solving and logical skills to programming in C language and also in other languages.

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I Year B. Tech ECE -I Sem	**L**	**T/P/D**	**C**
	2	**-/-/3**	**4**

(R15A0302) ENGINEERING DRAWING

UNIT – I

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

a) Polygons-Construction of Regular Polygons (General methods only no special methods).
b) Conic Sections Including Rectangular Hyperbola
c) Cycloid, Epicycloid and Hypocycloid
d) Scales-Plain, Diagonal and Vernier Scales

UNIT – II

Projection: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points. Points in all four quadrants.

Projections of Lines - Parallel, perpendicular inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

Projections Of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both reference planes.

UNIT – III

Projections Of Solids: Projections of regular solids, cube, prisms, pyramids, cylinder and cone, axis inclined to both planes.

Sections and sectional views: Right regular solids-prism, Cylinders, Pyramid, Cone,

Develoment of surfaces: Develoment of surfaces of Right Regular solids-Prism, Cylinder, Pyramids, Cone and their parts. Frustum of solids.

UNIT – IV

Intersection of solids: Intersection of cylinders Vs cylinder, Cylinders Vs Prism , Cylinder Vs Cone.

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

UNIT – V

Persespective projections: Perspective view: Points,Lines, Planes and solids, Visual Ray and vanishing point methods.

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

TEXT BOOKS

1.Engineering Drawing – Basant, Agrawal, TMH

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.
3. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.

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(R15A0581) COMPUTER PROGRAMMING LAB

Objectives:

1. Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
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. Concept of Array and pointers dealing with memory management.
7. Structures and unions through which derived data types can be formed
8. File Handling for permanent storage of data or record.
9. 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.

c) Write a C program to generate the first n terms of the Fibonacci sequence.

Week 2:

a)Write a C program to generate prime numbers between 1 to n.

b)Write a C program to Check whether given number is Armstrong Number or Not.

c) Write a C program to evaluate algebraic expression (ax+b)/(ax-b).

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 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 length of the string using Pointer.

Week 13:

a) Write a C program to Display array elements using calloc( ) function.

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

Week 14:

a)Write a C program that uses functions and structures to perform the following operations:

i) Reading a complex number ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex numbers

b) Write a C program to display the contents of a file.

Week 15:

a)Write a C program to copy the contents of one file to another.

b)Write a C program to merge two files into a third file.

c)Write a C program to reverse the first n characters in a file.

Week 16:

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.

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(R15A0083) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any EIGHT experiments compulsory)

Objectives:

1. 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.
2. The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.
3. The experiments are selected from various area of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.
4. Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance, Spectrometer and Microscope.

1. The Rigidity modulus (η) of the material of the wire using a Torsional pendulum.
2. Frequency of a vibrating bar, or a tuning fork using Melde's Experimental Arrangement
3. CR Circuit
4. Dispersive power of the material of the given prism-Spectrometer
5. Solar cell characteristics
6. Single slit diffraction Using laser
7. L.C.R. Circuit
8. Determination of the wavelength of sodium light and or (b) the radius of curvature of the surface of the Plano convex lens by forming Newton's rings.
9. Numerical Aperture In Optical Fibers
10. LED Characteristics

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna&Dr.K.VenkateswaraRao

   (V.G.S Publishers)

2. Engineering Physics Lab Manual by Dr. C .V. MadhusudhanaRao&V.Vasanth Kumar

   (SciTech Publishers)

Outcomes:

1. The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

2. With the exposure to these experiments the student can compare the theory and correlate with experiment.

ENGINEERING CHEMISTRY LAB

***List of* Experiments** (Any Eight experiments compulsory)

Titrimetry:

1. Estimation of hardness of water by EDTA method.
2. Estimation of alkalinity of water.

Mineral analysis:

3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

Colorimetry:

4. Determination of ferrous iron in cement by colorimetric method
5. Estimation of copper by colorimetric method

Conductometry:

6. Conductometric titration of strong acid vs strong base.
7. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

8. Titration of strong acid vs strong base by potentiometry.

Preparation:

9. Preparation of Phenol Formaldehyde Resin
10. Preparation of Aspirin

Physical properties:

11. Determination of viscosity of sample oil by Redwood Viscometer.
12. Determination of Surface tension of liquid by Stalagmometer

TEXT BOOKS:

1. Inorganic quantitative analysis, Vogel.
2. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
3. Laboratory manual of Engineering Chemistry by Y. BharathiKumari and JyotsnaCherukuri (VGS Techno series)

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(R15A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - I

The Language Lab focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives

1. To facilitate computer aided multi-media instruction enabling individualized and independent language learning
2. To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus: English Language Communication Skills Lab shall have 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**

Exercise –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions

ICS Lab: Ice-Breaking activity - JAM session

Exercise –II

CALL Lab: Pronunciation- Mispronounced sounds, Silent letters-Past Tense Markers and Plural Markers

ICS Lab: Situational Dialogues –Role Plays - Expressions in Various Situations –Self-introduction and Introducing Others –Greetings –Apologies –Requests- Refusal- Permissions – Complementing – Congratulating - Consoling

Exercise -III

CALL Lab: Syllable and Syllabification

ICS Lab: Etiquette – Social and Professional Telephone Etiquette

Outcomes:

1. Better Understanding of nuances of language through audio-visual experience and group activities.
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students.

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(R15A0002) PROFESSIONAL ENGLISH

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Objectives:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
3. To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.

1. Listening for general content
2. Listening to fill up information
3. Intensive listening
4. Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
    1. Oral practice
    2. Describing objects/situations/people
    3. Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English : A Communicative Approach)
    4. Just A Minute (JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and
2. comprehension.
3. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
    1. Skimming the text
    2. Understanding the gist of an argument
    3. Identifying the topic sentence
    4. Inferring lexical and contextual meaning
    5. Understanding discourse features
    6. Scanning the text
    7. Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
    1. Writing sentences
    2. Use of appropriate vocabulary

3. Paragraph writing
4. Coherence and cohesiveness
5. Narration / description
6. Note Making
7. Formal and informal letter writing
8. Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units are prescribed in each semester:

For Detailed study

First text book entitled "Skills Annexe: Functional English for Success", published by Orient BlackSwan, Hyderabad.

For Non-detailed study

Second textbook titled "Epitome of Wisdom", published by Maruthi Publications, Guntur.

Unit –I:

1. Chapter entitled "The Road Not Taken", a poem by Robert Frost, from *A Selection of Robert Frost's Poems (Owl Book)*, by Holt Paperbacks: 2 Revised Edition. 2002.

L- Listening – Project Based Assignment on poem 'If' by Rudyard Kipling
S- Speaking – Describing Persons and Places
R- Reading – Comprehending Poem
W- Writing – Business Circulars and Notices
G- Grammar – Adjectives, Comparison of Adjectives
V- Vocabulary – Similes and Metaphors

Unit – II

1. Chapter entitled "Human Values and Professional Ethics" from *Skills Annexe -Functional English for Success*, published by Orient Black Swan, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Description of Objects, Events and Experiences
R- Reading – What I Cherish the Most
W- Writing – CV and Cover Letter (Self-Appraisal Letter)
G- Grammar – Transitive and Intransitive Verbs
V- Vocabulary – Collocations

Unit – III

1. Chapter entitled "The Convocation Speech" from *Epitome of Wisdom*, published by Maruthi Publications, Hyderabad.

L- Listening – Project Based Assignment

S- Speaking – Giving Directions and Instructions
R- Reading – What is meant by Entrepreneurship?
W- Writing – Essay Writing (On-the-Spot Organization of Thoughts)
G- Grammar – Active and Passive Voices
V- Vocabulary – One-word Substitutes

Unit – IV

1. Chapter entitled "The Last Leaf" from *Epitome of Wisdom*, published by Maruthi Publications, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Oral Presentations
R- Reading – Reading Comprehension
W- Writing – Report Writing
G- Grammar – Concord
V- Vocabulary – Idiomatic Expressions

Unit –V

1. Chapter entitled "Sachin Tendulkar" from *Skills Annexe -Functional English for Success*, published by Orient Black Swan, Hyderabad.

L- Listening – Project Based Assignment
S- Speaking – Project Oral Presentations
R- Reading – Reading Articles
W- Writing – E-mail Writing
G- Grammar – Common Errors
V- Vocabulary – Misspelt Words

* Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw – Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publish.

Outcomes:

1. Usage of English Language, written and spoken.
2. Enrichment of comprehension and fluency.
3. Gaining confidence in using language in verbal situations.

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I Year B.Tech ECE -II SEM	**L**	**T/P/D**	**C**
	5	**1/-/-**	**4**

(R15A0022)MATHEMATICS-II

Objectives

1. The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
2. 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 and to solve differential equations.
3. In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very required. Indeed, any periodic and non periodic function can be best analyzed in one way by Fourier series method.
4. PDE aims at forming a function with many variables and also their solution methods .Method of separation of variables technique is learnt to solve typical second order PDE.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the unit vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I: Solution of Algebraic and Transcendental Equations and Interpolation

Solution of Algebraic and Transcendental Equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Interpolation: Introduction-Errors in polynomial interpolation-Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae – Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT – II : Numerical techniques and Curve Fitting

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

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method – Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – III: Fourier series

Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π. Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine expansions-Fourier series in an arbitrary interval .

UNIT-IV: Partial differential equations

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

UNIT – V : Vector Calculus

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

PRESCRIBED TEXT BOOKS:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.

Outcomes:

1. From a given discrete data, one will be able to predict the value of the data at an intermediate point and The student will be able to find a approximate root of a given equation.
2. By curve fitting, one can find the most appropriate formula for a guesses relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making. and will be able to find a numerical solution for a given differential equation.
3. One will be able to find the expansion of a given function by Fourier series.

4. After studying this unit, one will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
5. The student will be able to evaluate multiple integrals(line, surface volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.

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	3	**/- /-**	**2**

(R15A0012) ENGINEERING PHYSICS-II

OBJECTIVES:

1. To understand the basics of bonding in solids , crystal structures and characterization techniques.
2. To make the students aware of X-ray diffraction and different techniques of it.
3. To understand the behavior of dielectric materials, magnetic materials and nano materials.

UNIT-I

BONDING IN SOLIDS: Types of bonds- Primary, Secondary, Forces between atoms, Expression for cohesive energy between two atoms**.**

CRYSTALLOGRAPHY: Introduction, Lattice points, Space lattice, Basis, Unit cell, lattice parameters, Crystal systems, Bravais lattices, Atomic number, coordination number, packing factor of SC,BCC,FCC crystals, Lattice planes, miller indices. Expression for inter planar distance in cubic crystal.

UNIT- II

X-RAY DIFFRACTION: Bragg's law**,** Experimental techniques -Laue's method, powder method**.** Applications of x-ray diffraction.

DEFECTS IN CRYSTALS: Types of crystal defects**,** Point defects-Vacancies, Interstitials, Estimation of defect concentrations of Schottky and Frenkel defects, Line defects- edge dislocation and screw dislocation**.** Burger's vector.

UNIT-III

DIELECTRIC PROPERTIES: Electric dipole, Dipole moment, Polarization vector (P) Displacement vector (D), Dielectric constant (K), Electric susceptibility (χ).types of polarizations-Expression for Electronic and Ionic polarization (Qualitative). Internal fields in dielectrics Classius Mosotti relation. Ferro electricity and Piezo electricity, Applications of dielectric materials.

ULTRASONICS: Introduction-generation of Ultrasonic waves-piezoelectric and magneto-striction method. Properties and Detection of Ultrasonic waves, NDT.

Unit-IV

MAGNETIC PROPERTIES: Magnetic permeability, Field intensity, Magnetic field induction, Magnetization, Magnetic susceptibility, Magnetic moment, Bhor magneton**.** Classification of

magnetic materials-Dia, Para and Ferro**.** Ferri and Anti ferro magnetic materials. Explanation of Hysteresis loop on the basis of domain theory of ferromagnetism. Soft and hard magnetic materials.

SUPER CONDUCTIVITY: Super conductivity, General properties of super conductivity Meissner effect**,** Types of super conductors**,** Applications of super conductors.

UNIT-V

NANO SCIENCE & NANO TECHNOLOGY: Nano scale. Types of Nano materials-Surface to volume ratio and Quantum confinement. Synthesis of Nano materials-Bottom up Fabrication and Top down Fabrication- Sol gel, Bcs Theory, Physical Vapour Deposition. Characterisation of Nano particles –XRD and SEM . Applications of Nano materials.

TEXT BOOKS:

1 .Engineering Physics, Dr M Arumugam, Anuradha Publishers
2. A Text Book of Engineering Physics –P. G. Kshirsagar– S. Chand

REFERENCES:

1. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
2. Nanotechnology – M. Ratner & D. Ratner (Pearson Ed.).

OUTCOMES:

1. The students would be able to learn the fundamental concepts on behavior of crystalline solids.
2. The student will be able to think about the applications of dielectric, magnetic and nano materials.
3. Finally Engineering physics course help the student to develop problem solving skills and analytical skills.

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4 1/-/- 3

(R15A0502)OBJECT ORIENTED PROGRAMMING

Objectives

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

Unit I

Concepts of Object Oriented programming: Object oriented paradigm - Basic concepts of Object Oriented Programming - differences between Object Oriented Programming and Procedure oriented programming,Overview of OOP principles, Encapsulation, Inheritance and Polymorphism. Benefits of OOP.Structure of a C++ program, Program structure, namespace, Data types, identifiers, variables, constants, enum, operators, typecasting, 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, Default Arguments, Function Overloading, Friend Functions

Unit-III

Constructors, Destructors, Inheritance:

Introduction to Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Copy Constructors, Dynamic Constructors, Destructors.

Inheritance : Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi-Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Abstract Classes, Constructors in Derived Classes,Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

Unit-IV

Pointers, Virtual Functions and Polymorphism:

Introduction, Memory Management, new Operator and delete Operator, Pointers to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, compile time

polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Virtual Base Classes, Virtual Destructors.

Unit-V.

Templates and Exception handling:

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

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

Streams I/O: Stream classes hierarchy, Stream I/O, File streams and String streams, Error handling during file operations

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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(R15A0201)ELECTRICAL CIRCUITS

Objective:
This course introduces the basic concepts of network and circuit analysis which is the foundation of the Electrical Engineering discipline. The emphasis of this course if laid on the basic analysis of circuits which includes network analysis, single phase AC circuits, network theorems and transformers.

Unit –I:
Introduction to Electrical Circuits: Concept of Network and Circuit, Types of elements, Types of sources, Source transformation. R-L-C Parameters, Voltage–Current relationship for Passive Elements (for different input signals –Square, Ramp, Saw tooth and Triangular), Kirchhoff's Laws.

Unit –II:
Network Analysis:
Network Reduction Techniques-Resistive networks, Inductive networks and capacitive networks- Series, Parallel, Series-Parallel combinations, Star–to-Delta and Delta-to-Star Transformation. Mesh Analysis and Super mesh, Nodal Analysis and Super node for DC Excitation. Network topology-Definitions, Graph, Tree, Basic Cut set and Basic Tie set Matrices for Planar Networks.

Unit-III:
Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for different periodic wave forms. J-notation, 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.

Unit –IV:
Network Theorems (D.C&A.C): Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Substitution, Compensation and Milliman's theorems.

Unit –V:
Transformers: Principle of operation, constructional details, Types, Ideal transformer and practical transformer, Losses, Equivalent circuit, Phasor diagram on No load and load, Efficiency and regulation, OC test and SC test.

TEXT BOOKS:
1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits - A.Chakrabarhty, Dhanpat Rai & Sons.
3. A Text book of Electrical Technology by B.L Theraja and A.K Theraja, S.Chand publications.

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. Principles of Electrical Engineering by V.K Mehta,RohitMehta,S.Chand publications.

Outcome:

1. After going through this course the student gets a thorough knowledge on basics of network and circuit concepts, circuit elements, network analysis, single phase AC circuits, network theorems, transformers with which he/she can able to apply the above conceptual things to real-world problems and applications.

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(R15A0014)ENVIRONMENTAL STUDIES

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 Environmental Sciences.

Ecosystems: Definition, Scope and Importance of ecosystem. Brief Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles (Carbon, Oxygen, Nitrogen, Water, phosphorus, sulphur cycle) Bioaccumulation, Biomagnification, and carrying capacity.

UNIT-II:

Natural Resources: Classification of Resources: water resources: use and over utilization of surface and ground water, water conservation Dams: benefits and problems. Forest resources, 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, Automobile and Industrial pollution, reduction of pollutants. **Water pollution**: Sources and types of pollution, water treatment methods. **Soil Pollution**: Sources and types, Impacts of modern agriculture, degradation of soil. Solid waste and its management, composition and characteristics of e-Waste and its management.

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

Natural Hazards (Droughts, Floods, Cyclone, Landslides, Earthquake, Tsunami) and Disaster Management, Carbon Footprint.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act1986, Air Act- 1981, Water Act 1974, Forest conservation act 1980, Wild life Protection Act-1972, Municipal solid waste management and handling rules, biomedical waste management and handling rules,

hazardous 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 of Sustainable Development, Population and its explosion, Environmental Education, Concept of Green Building.

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:

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 helps in sustainable development.

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(R15A0582)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:

Study of C++ Standard library functions.

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 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.
c) Write aProgram 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
assign()	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

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

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

Write a C++ program that uses functions to perform the following operations to:

i. Insert a sub-string in to the given main string from a given position.
ii. Delete n characters from a given position in a given string.

Week 15

a) Write a C++ program to display the contents of a text file.
b) Write a C++ program which copies one file to another.

Week 16

Revision laboratory

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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(R15A0084) IT WORKSHOP LAB / ENGINEERING WORKSHOP

Objective:

The IT Workshop for engineers is a training lab course. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

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 , Linux and the required device drivers. 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 and LaTeX.

PC Hardware

Week 1:

Task 1: Generations of computers, Types of Computers, applications of computers Von Neumann architecture. Identify the different hardware components of a PC & their functions.

Task 2: practice to disassemble and assemble the components of a PC to working condition.

Week 2:

Task 3 : Installation of windows operating system in PC.

Task 4: Exposure to Basic commands in MS-DOS commands like ver, vol, date, time, cls, dir, md, cd, path, rd, copy con, type, copy, move, del, ren, prompt, ipconfig etc.

Week 3:

Task 5: Installation of operating systems LINUX and different packages on a PC.

Task 6: Exposure to Basic commands in Linux General Purpose utilities like man, who, tty, clear, date, cal, passwd; File Handling utilities like pwd, mkdir, rmdir, cp, rm, mv, cat, cd, ls, ln; Filters like wc, cmp, diff, head, tail, sort.

Week 4:

Task 7: Practice hardware troubleshooting exercises related to various components of computer like monitor, drives, memory devices, printers etc. and software troubleshooting related to BIOS etc.

NETWORKING

Week 5:

Task 8: Students should get to know about some of the Communication and Transmission devices, Network cabling, Features of Networking, Communication Protocols, Types of Network Topologies and Types of Networks.

Internet & World Wide Web

Week 6:

Task 9: Orientation & Connectivity Boot Camp and surfing the Web using Web Browsers: Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting and demonstrate how to access the websites and email. Students customize their web browsers using bookmarks, search toolbars and pop up blockers.

Week 7:

Task 10: Search Engines and Netiquette (Demonstration): Students should know about different search engines and their usage. A few topics would be given to the students for which they need to search on Google etc.

Week 8:

Task 11: Cyber Hygiene (Demonstration): Awareness of various threats on the internet. To install antivirus software and to configure their personal firewall and windows update on their computers.

Productivity Tools

Documentation

Week 9:

Task 12: Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007. Importance of LaTeX and MS office 2007. Give the details about LaTeX/MS word accessing, overview of toolbars, saving files and Using help and resources.

Week 10:

Task 13: Using LaTeX/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 and Mail merge in LaTeX/Word.

Week 11:

Task 14: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Presentation

LaTeX /MS Power Point

Week 12:

Task15: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week 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. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 13:

Task 16: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Excel

Week 14:

Task 17: Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Week 15:

Task 18: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Week 16:

Task 19 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken.
3. Quamme. – CISCO Press, Pearson Education.
4. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft).

Outcomes:

1. Apply knowledge for computer assembling and software installation
2. Ability how to solve the trouble shooting problems.
3. Apply the tools for preparation of PPT, Documentation and budget sheet etc.

ENGINEERING WORKSHOP

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

1. 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.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

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(R15A0082) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB- II

The Language Lab focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objective

1. To facilitate computer aided multi-media instruction enabling individualized and independent language learning
2. To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussion and public speaking

EXERCISE –IV

CALL Lab: Word Accent – Rules of Stress and Stress shift
ICS Lab: Describing Object, Places, Persons, Events and Experiences.

EXERCISE –V

CALL Lab: Intonation Types
ICS Lab: Giving Instructions and Directions

EXERCISE –VI

CALL Lab: Neutralisation of Mother Tongue Influence
ICS Lab: Oral Presentations Team and Individual
GRAMMAR EXERCISES: Articles, Prepositions, Concord, Correction of Sentences
VOCABULARY EXERCISES: Antonyms, Synonyms, One word substitutes, Prefix and Suffixes.

PROJECTS

Students have to choose one of the following projects for their internals, and submit before the end of the semester. This project carries 25 marks.

1. Conduct interview using interrogative sentences.

Students should interview any teacher, or HOD, or Principal, record their responses and submit the project with those questions and answers. The questions asked should not be less than ten.

2. Project on differences between group discussion and debate.

Students are supposed to do research on the differences between GD and debate and submit a project on it. There should a minimum of ten points with detailed explanation. Students can use pictures as well.

3. Book Review

Choose any fiction of your choice and write a book review on the following parameters.

- Characterization, plot, theme, message

Please note that the review is not the summary of the story. The project should not be less than 250 words.

4. Idioms and Phrasal Verbs

Collect at least ten idioms and ten phrasal verbs and concoct a story using those expressions. Word limit is 250.

5. Project on Kinesics

Students are expected to read and research on body language and their implications. You have to make a list of at least ten body movements with pictures and explain them properly.

6. UK and US vocabulary

Find words that are used differently in UK and US English. Make separate lists for different spellings and different pronunciations. The project can answer one or more of the following questions:

1. Which pronunciation do you think are Indians following?
2. Which one is your choice? Which one do you feel comfortable in speaking?
3. Are we Indians influenced by both UK and US English? How can you prove it?

7. Magazine Article Review

Pick a magazine article with a social relevance, which has around 2500 words. Write a review of 250 words as a project. Make sure you voice your opinion in the review.

8. Career Guidance Project

Browse the net and gather information on any professional competitive exam of your choice, like UPSC or GRE. Prepare and present a paper on the scope and relevance of the exam of your choice. The paper should have a minimum of 300-400 words. Students are expected to answer the questions asked by the audience after the paper presentation.

9. Mother Tongue Influence

Choose a particular paragraph of 250 words and ask five of your friends, from different states, to read that. One has to record their accent and pronunciation to check the

difference. Make a list of ten words that each one pronounces differently. Find out the reasons behind the differences in pronunciations.
Also, mention the correct pronunciation in your project with transcription.

10. Correction of Letter Writing: Language, Sentences, Spelling, Tone and Format
Teacher will distribute a set of five letters with errors in spelling, tone, grammar and sentence construction. Give the correct form of the letters as the project

ELCS Lab:

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

The Computer aided Language Labfor 40 students with 40 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 :
The Interactive CommunicationSkills 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.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories.
2. New Delhi: Foundation
3. Speaking English Effectively 2ndEdition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
5. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013.Orient Blackswan. Hyderabad.
7. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
8. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
9. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi: Foundation
10. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
11. Spoken English(CIEFL) in 3 volumes with 6 cassettes, OUP.
12. English Pronouncing DictionaryDaniel Jones Current Edition with CD.

13. A textbook of English Phonetics for Indian Studentsby T.Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

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 sessional 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 same institution

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(R15A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVES

(MANDATORY COURSE)

Objectives: This introductory course input is intended

1. To help the students appreciate the essential complementarity 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 Holiostic 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 form 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 behavior and mutually enriching interaction with Nature.

Unit-I:

Course Introduction – Need, Basic Guidelines, Content and Process of 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 lavels.

Unit-II:

Understand 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 does, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' . 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 Hum an-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 (socity being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva 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 Co-existence: 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-astiva) of mutually interacting units in all –pervasive space. Holistic perception of harmony at all level of existence.

Unit-V:

Implications of the above Holistic Understanding of Harmony on Societal Perspectives: Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis of Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in Societal Perspectives:

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 system.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers.
b) At the level of society: as mutually enriching institutions and organizations.

TEST BOOKS

1. R R Gaur, R Sangal, G P BAgaria, 2009 A Foundation Course in Human Values and professional Ethics.
2. Prof.KV Subba Raju, 2013, Success secrets for Engineering students , Smart student Publications,3rd Edition.

REFERENCE BOOKS

1. Ivan llich,1974, Energy & Equity, The Trinity press, Worcester and Harpercollins, USA.
2. E.F.Schumacher, 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 Sansathan Amarkantak.
4. Sussan George, 1976, How the other Half Dies, Penguin press Reprinted 1986,1991.
5. PL Dhar, RR 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, Willian A. Behrens lll, 1972, Limits to Growth –Club of Rome's report Universe Books.
9. E.G Seebauer & Robert L. Beery, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran , S Natrajan & V.S Senthil kuma, Engineering Ethichs (including Human Values), Eastern Economy Edition, prentice Hall of India Ltd.

Relevant CD,s Movies, Documentaries & other Literature:

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

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(R15A0023) MATHEMATICS – III

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 of convergence – 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 $\int_{-\infty}^{\infty} f(x)dx$ (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 .

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.

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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(R15A0401) ELECTRONIC DEVICES AND CIRCUITS

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: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation , volt-amper 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.

Special purpose electronic devices: Principal of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, SCR and photo diode

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, ⍰- section filter and comparison of various filter circuits, Voltage regulation using zener diode.

UNIT-III

BIPOLAR JUNCTION TRANSISTOR: The Junction transistor, Transistor current components, Transistor as an amplifier, Transistor construction, 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. BJT Hybrid Model, h-parameter representation of a transistor, 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 Ai, Ri ,Av,and Ro,

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 and transistor , (Compensation against variation in V_{BE}, I_{CO},) 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, principal of Operation and symbol), MOSFET

characteristics in Enhancement and Depletion modes. **FET Amplifiers**: FET Common source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, FET biasing.

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

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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(R15A0402) SIGNALS AND SYSTEMS

OBJECTIVES:

1. Coverage of continuous and discrete-time signals and representations and methods that is necessary for the analysis of continuous and discrete-time signals.
2. Knowledge of time-domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc.
3. Knowledge of frequency-domain representation and analysis concepts using Fourier analysis tools, Z-transform.
4. Concepts of the sampling process.
5. Mathematical and computational skills needed in application areas like communication, signal processing and control, which will be taught in other courses.

UNIT I:

INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Basic Operations on signals, Classification of Signals.

SIGNAL ANALYSIS: Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.

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, Fourier transform of periodic 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, system, 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, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT IV:

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain, Graphical representation of convolution, 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, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

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. Laplace transform of certain signals using waveform synthesis. **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 & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. 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.

OUTCOMES:

Upon completing this course the student will be able to:

1. Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands
2. the principles of impulse functions, step function and signum function.
3. Express periodic signals in terms of Fourier series and express the spectrum and express the
4. arbitrary signal (discrete) as Fourier transform to draw the spectrum.
5. Understands the principle of linear system, filter characteristics of a system and its bandwidth, the
6. concepts of auto correlation and cross correlation and power Density Spectrum.
7. Can design a system for sampling a signal.
8. For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
9. Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties,
10. ROC of Z Transform

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(R15A0403) 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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(R15A0202) ELECTRICAL TECHNOLOGY

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 DC 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:

Filters and Symmetrical Attenuators: Introduction to filters**,** Classification of Filters, Filter Networks, Characteristic Impedance, Classification of Pass Band and Stop Band, Characteristic Impedance in the Pass and Stop bands, Constant-k Low Pass and High Pass Filters-derived T-section and π-section, Band Pass Filter and Band Elimination Filter, Illustrative problems.

Symmetrical Attenuators: T-Type Attenuator, π-Type Attenuator, Bridged T-Type Attenuator, Lattice Attenuator.

UNIT - IV:

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 - V:

DC Machines: Principle of operation and operation of DC Generator, EMF equation, Types, Losses and Efficiency, Magnetization and Load Characteristics of DC Generators. DC Motors-Principle of operation, Types, Characteristics, Losses and Efficiency, Swinburne's Test, Speed control of DC Shunt Motor-Flux and Armature voltage control methods.

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.

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.

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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OPEN ELECTIVE - I

(R15A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

OBJECTIVES:

1. 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.
2. 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.
3. To understand and analyse the financial formats of the organisation 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 Of Demand: Definition, Types, Measurement and Significance of elasticity of Demand. Demand Forecasting, Factors governing demand Forecasting, methods of demand Forecasting.

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) - Managerial Significance.

Unit-III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Objectives and Policies of Pricing- Methods of Pricing.

Business: Features of different forms of Business Organisation, Changing Business Environment in Post-liberalization scenario.

Unit-IV

Introduction to Capital and Financial Accounting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance – Trading forecast, Capital Budget, Cash Budget.

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

Unit-V

Investment Decision: Features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

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, Hyderabad 2013
3. M. Kasi Reddy & Sarawathi, Managerial Economics and Financial Analysis, PHI, New Delhi, 2010.

REFERENCES:

1. S.N.Maheswari & S. K. Maheswari, Financial Accounting, Vikas, 2012.
2. D.N. Dwivedi, Managerial Economics, Vikas, 2012.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage, 2012
4. A,R.Aryasri: Managerial Economics and Financial Analysis, McGraw-Hill, 2011.

OUTCOMES:

Students should be able

1. To understand the basic economic principles, forecast demand and supply.
2. Should be able to estimate cost and understand market structure, pricing practices.
3. Able to interpret the financial results of the organisation.

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OPEN ELECTIVE - I

(R15A0066) DISASTER MANAGEMENT

OBJECTIVES:

1. 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.
2. 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.

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

TEXT BOOKS:

1. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
2. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
3. Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.

REFERENCES:

1. Central Water Commission, 1989, Manual Of Flood Forecasting, New Delhi.
2. Government of India, 1997, Vulnerability Atlas Of India, New Delhi.
3. Sahni, Pardeep Et.Al. (Eds.) 2002, Disaster Mitigation Experiences and Reflections. Prentice Hall Of India, New Delhi.

OUTCOMES:

1. After completing this session, you will be able to affirm the usefulness of integrating management principles in disaster mitigation work.
2. They can distinguish between the different approaches needed to manage pre- during and post- disaster periods.

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OPEN ELECTIVE - I

(R15A0067) TECHNOLOGY MANAGEMENT

OBJECTIVES:

1. The Objective of the course is to expose students to the importance of technology in conduct of business and its skillful management for optimum results.

Unit-I

The Process of Technological Innovation: The Need for a Conceptual Approach, Technological Innovation as a Conversion Process, Factors Contributing to Successful Technological Innovation. Strategies For Research and Development: R&D as A Business, Resource Allocation to R&D, R&D Strategy In the Decision Making Process, Selection and Implementation of R&D Strategy, R and D and Competitive Advantage, New Product Development- Techniques For Creative Problem Solving.

Unit-II

Financial Evaluation of Research and Development Projects: The Need For Cost Effectiveness, R&D Financial Forecasts, Risk as a Factor In Financial Analysis, Project Selection Formulae, Allocation of Resources, DCF and Other Techniques of evaluating R&D ventures.

Unit-III

Research and Development: Programme Planning and Control, Portfolio Planning, Project Planning and Control, Project Termination, Resource Allocation and Management- New Product Development: New Product Development as a Competitive Strategy, Market Research For Developing New Products, Commercialisation of Research Outcomes, Industrial Design, Product Architecture and Design For Manufacture, Developing Indigenous Substitute For Raw Materials.

Unit-IV

Technological Forecasting For Decision Making: The Definition of Technological Forecasting, Forecasting System Inputs and Outputs, Classification of Forecasting Techniques, Organisation For Technological Forecasting, Current Status.

Unit-V

Transfer of Technology: Modes of technology transfer, Price of technology transfer, Negotiation for price of MOT.

REFERENCES:

1. Tarek Khalil: Management of Technology-The Key to Competitiveness and Wealth Creation, McGraw Hill, Boston, 2009.
2. Krishnamacharyulu: Management of Technology, HPH, 2009
3. V.K.Narayanan: Managing Technology and Innovation for Competitive Advantage, Pearson Education, 2009.
4. Krishnamacharyulu & Lalitha: Management of Innovation, Himalaya, 2009.
5. Norma Harison and Samson: Technology management – Text and cases, TMH, 2009
6. Shane: Technology Strategy for Managers and Entrepreneurs, Pearson, 2009

OUTCOMES:

1. Improvement of best practices in companies.
2. Assessment of impact of technology in different areas to meet desired outputs.
3. Identification of tech mgt activities and areas of strength and weaknesses in specific sectors of businesses.
4. Insight into detailed process of key areas of technology.

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(R15A0481) 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 characteristics
6. input and output characteristics of transistor in common -emitter configuration
7. h-parameters of CB configuration
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, BJTs, LCDs, SCRs, UJTs, FETs,LEDs, MOSFETs,Diodes- Ge& Si type, Transistors – NPN, PNP type

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(R15A0482) 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

(R15A0004) 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.

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, pefumes 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.

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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MANDATORY COURSE – II

(R15A0005) FOREIGN LANGUAGES: GERMAN

OBJECTIVES :

1. To familiarize the students with a modern foreign language.
2. To familiarize the students with the sounds of German and their symbols.
3. To familiarize students with German for basic communication and functions in everyday situations.
4. To familiarize students with the basic of writing simple, direct sentences and short compositions.

SYLLABUS:

UNIT I

Current trends in German orthography, German grammar and lexical units, discourse models, oral and written.

UNIT- II

Communication patterns, prose passages, etc.

UNIT- III

Communication skills in everyday situations

UNIT-IV

Training in creative writing in German.

UNIT- V

Training in creative speaking in German.

TEXT BOOKS

Lernziel Deutsch

Reference books:

Themen
Tangram
Sprachkurs Deutsch
Schulz-Griesbach

Outcomes

1. Students familiarize with a modern foreign language – German
2. The students with German get acquainted for basic communication in everyday situations.
3. Students will know with the basics of writing simple direct sentences and short compositions.
4. Students get to know the basics of German language to communicate in the work place when they find the necessity.

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II Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
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(R15A0203) 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, Feed Back Characteristics. Mathematical models for mechanical systems – Differential equations and transfer functions. Analogous systems -Force –Voltage and Force-Current analogy.

Transfer Function Representation: Block diagram algebra, Block diagram representation for mechanical and electrical systems, Representation by Signal flow graph - Reduction using Mason's gain formula.

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, Effects of adding poles and zeros to G(s) H(s) on the root loci.

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- Nyquist plots, Stability analysis. Compensation techniques – Lag, Lead, Lead-Lag and Lag-Lead Controllers design in frequency Domain.

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:

1. Control Systems Engineering - I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
2. Control Systems - A. Ananad Kumar, PHI.
3. Control Systems Engineering by A. Nagoor Kani, RBA Publications.

REFERENCE 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, KATSON BOOKS.
5. 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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(R15A0404) PULSE AND DIGITAL CIRCUITS

OBJECTIVES

This subject introduce about

1. Wave shaping concepts of both linear and non-linear circuits.
2. Study about the switching characteristics of diodes.
3. Study about the designing of multivibrators and sampling gates.
4. Learn about the realization of different logic gates and their properties.

UNIT 1

LINEAR WAVE SHAPING:

High pass and low pass RC circuits and their response for sinusoidal, step voltage, pulse, and square wave and ramp inputs. High pass RC circuit as a differentiator. Low pass RC circuit as an integrator. Attenuators and their application as CRO probe. RL and RLC circuits and their response for step input. Ringing circuit.

UNIT 2

NON-LINEAR WAVE SHAPING:

Diode clippers. Transistor clippers. Clipping at two independent levels. Comparator – applications of voltage comparators – diode comparator. Clamping operation. Clamping circuits using diode with different inputs. Clamping circuit theorem. Practical clamping circuits.

UNIT 3

MULTIVIBRATORS:

Transistor as a switch - switching times of a transistor. Monostable, bistable and astable multivibrators. Schmitt trigger.

UNIT 4

SWEEP CIRCUITS:

Voltage sweep simple exponential sweep generator. Errors that define deviation from linearity, UJT relaxation oscillator – methods of linearising a voltage sweep - bootstrap and Miller circuits – current sweep– linearising a current sweep by adjusting the driving waveform.

UNIT 5

SYNCHRONISATION, FREQUENCY DIVISION AND LOGIC GATES

Principles of synchronisation – synchroisation of astable multivibrators. Synchronisation of sweep circuits with symmetrical signals. Phase delay and phase jitter. IC families, DTL, TTL, CMOS, ECL, and circuits.

TEXT BOOKS :

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

REFERENCES:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

OUTCOMES

At the end of the course, the student will be able to;

1. Understand the concepts of integrators, differentiators, clippers and clamper circuits
2. Learn various switching devices such as diode and transistors
3. Difference between logic gates and sampling gates
4. Design of multivibrators for various applications, synchronization techniques and sweep circuits
5. Realizing logic gates using diodes and transistors

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(R15A0405) ELECTRONIC CIRCUIT ANALYSIS

OBJECTIVE

1. To familiarize the student with the analysis and design of basic transistor amplifier circuits and their frequency response characteristics, feedback amplifiers, oscillators, large signal amplifiers and tuned amplifiers
2. To demonstrate basic understanding of amplifier operation.
3. To analyze amplifier circuits using hybrid model.

UNIT - I

SINGLE STAGE AMPLIFIERS: Classification of amplifiers, Transistor hybrid model, Analysis of a transistor CE, CB & CC amplifier circuit using simplified h-parameters, Analysis of CE amplifier with emitter resistance and emitter follower. Design of single stage RC coupled amplifier using BJT

MULTISTAGE AMPLIFIERS: Distortion in amplifiers, Analysis of cascaded RC coupled BJT amplifier, cascode amplifier, Darlington pair, Coupling schemes-RC coupled amplifier, transformer coupled amplifier, Direct coupled Amplifier, multistage amplifier using JFET

UNIT – II

BJT Amplifiers- Frequency Response: Logarithms, Decibels, general frequency considerations, Frequency response of an amplifier Analysis at low and High Frequencies, Hybrid-pi (π) common emitter transistor model, hybrid - π conductances and capacitances, 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, emitter follower at high frequencies.

UNIT - III

FEEDBACK AMPLIFIERS: Concept of Feedback and types, transfer gain with feedback, general characteristics of negative feedback amplifiers, Effect of negative feedback on amplifiers characteristics, voltage series, current series, current shunt, and voltage shunt feedback amplifiers.

OSCILLATORS: Classification of oscillators, Constituents of an oscillator, Barkhausen criterion, RC phase shift oscillator, Wein-bridge oscillator, Generalized analysis of LC oscillators- Hartley and Colpitts oscillator, Crystal oscillator ,Stability of oscillator, Wein bridge oscillator, Crystal oscillator, frequency stability.UJT relaxation oscillator.

UNIT - IV

LARGE SIGNAL AMPLIFIERS: Classification , Distortion in amplifiers, class A large signal amplifiers, transformer coupled class A power amplifier, 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, class C amplifiers, class D amplifier, thermal stability, heat sink.

UNIT - V

TUNED AMPLIFIERS: Introduction, classification of tuned amplifiers, small signal tuned amplifier, Effect of cascading single tuned amplifier on bandwidth, Effect of cascading Double tuned amplifier on bandwidth, Staggered tuned amplifier, stability of Tuned Amplifier

TEXT BOOKS:

1. Integrated Electronics-Jacob Millman and Christos C. Halkias,1991 Ed -2008,TMH.
2. Electronic Devices and Circuits, B.P Singh, Rekha Singh,Pearson, 2013.

REFERENCE BOOKS:

1. Electronic Circuit Analysis- Rashid, Cengage Lerning, 2013.
2. Electronic Devices and Circuit Theory-Robert L. Boylestad, Louis Nashelsky, 9 Ed,2008 PE.
3. Microelectric Circuits-Sedra and Smith-5 Ed., 2009, Oxford University press.
4. Electronic Circuit Analysis-K.LalKishore, 2004, BSP.
5.Electronic Devices and Circuits-S.Salivahanan ,N.Suresh Kumar,A Vallavaraj,2Ed.,2009, TMH.

OUTCOMES

1. Design and analyze the DC bias circuitry of BJT and FET.
2. Analyze the different types of amplifiers, operation and its characteristics
3. Design circuits like amplifiers, oscillators using the transistors diodes and oscillators

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(R15A0406) ELECTROMAGNETICS THEORY AND TRANSMISSION LINES

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 transmission lines, and their practical applications.
3. To study the propagation, reflection, and transmission of plane waves in bounded unbounded media.
4. To present the concepts of transmission lines, and this is a prerequisite course for "Antennas"

UNIT - I:

Electrostatics: Review of coordinate system, Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Equations for Electrostatic Fields, Energy Density, Divergence theorem, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance - Parallel plate, Illustrative Problems.

UNIT - II:

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, Forces due to Magnetic Fields, Ampere's Force Law, Inductance and Magnetic Energy, Illustrative Problem.

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Differrent Final Forms, Conditions at a Boundry Surface: Dielectric - Dielectric, Illustrative Problems.

UNIT - III:

EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics - Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Illustrative Problems.

EM Wave Characteristics - II: Reflection and Refraction of Plane Waves - Normal for both perfect Conductor and perfect Delectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem - Applications, Power Loss in a Plane Conductor., Illustrative Problems.

UNIT - IV:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedence, 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. 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. Transmission Lines and Networks - Umesh Sinha, Satya prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES BOOKS:

1. Engineering Electromagnetics - Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics - William H. Hay Jr. and John A. Buck, 7thEd., 2006, TMH.
3. Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.
4. Networks, Lines and Fields - John D. Ryder, 2nd Ed., 1999, PHI.

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. Analyze basic transmission line parameters in phasor domain
4. Use Maxwell equation to describe the propagation of electromagnetic waves in vaccum
5. Show how waves propagate in dielectrics and lossy media
6. Demonstrate the reflection and refraction of waves at boundaries
7. Explain the basic wave guide operation and parameters

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(R15A0407) SWITCHING THEORY AND LOGIC DESIGN

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.

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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II Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
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OPEN ELECTIVE - II

(R15A0064) ENTERPRISE RESOURCE PLANNING

OBJECTIVES:

1. It enables the student to understand the foundations of Enterprise planning and ERP System Options.

Unit-I

Introduction to ERP: Foundation for Understanding ERP systems-Business benefits of ERP-The challenges of implementing ERP system-ERP modules and Historical Development.

Unit-II

ERP System Options & Selection Methods: Measurement of project Impact- information Technology Selection-ERP proposal evaluation-Project Evaluation Technique.

Unit-III

ERP System Installation Options: IS/IT Management results-Risk Identification analysis-System Projects- Demonstration of the system-Failure method-system Architecture & ERP.

Unit-IV

ERP-Sales and Marketing- Management control process in sales and marking-ERP customer Relationship Management-ERP systems- Accounting & Finance control processes. Financial modules in ERP systems.

Unit-V

ERP–Production and Material Management-Control process on production and manufacturing-Production module in ERP- supply chain Management & e-market place-e-businesses & ERP-e supply chain & ERP- Future directions for ERP.

TEXT BOOK:

1. Mary Sumner “Enterprise Resource Planning” Pearson, 2012.
2. David L.Olson “Managerial Issues in ERP systems” TMH 2012.

REFERENCES:

1. Ellen Monk “Enterprise Resource Planning” Cengage, 2012.
2. Alexis Leon “Enterprise Resource Planning” 2nd Edition, TMH ,2012
3. Goyal “Enterprise Resource Planning” TMH, 2012
4. Jagan Nathan Vaman “ERP Strategies for Steering Organizational competence and competitive Advantage” TMH, 2012.
5. Rajesh Ray “Enterprise Resource Planning” TMH, 2012
6. Jyotindra Zaveri, Enterprise Resource Planning, HPH, 2012.

OUTCOMES:

1. The student understands the challenges in implementation of ERP system, ERP System Implementation options, and functional modules of ERP.

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OPEN ELECTIVE - II

(R15A0065) MANAGEMENT SCIENCE

OBJECTIVES:

1. This course is intended to familiarize the students with the basic knowledge of Management related concepts, Organization structures, Control charts, Marketing management, Human resource management, Project management, Strategic management in order to achieve the positions of future leaders and managers.

Unit-I

Introduction to Management: Nature of Management, importance functions of Management, Systems approach to Management, Taylor's scientific Management theory, Fayal's principles of Management, Maslow's need hierarchy theory, McGregor's Theory X and Theory Y, Hertzberg Two Factor Theory of Motivation, Leadership Styles, Social responsibilities of Management.

Unit-II

Organization Structures, Control charts and Marketing Management: Line Organization structure, Line and Staff organization structure, Matrix organization structure, Team Organization structure, Control charts ($\bar{X}$ chart, R chart, C chart, P chart), EOQ, ABC analysis, Functions of Marketing, Marketing Mix, Marketing strategies based on PLC.

Unit-III

Human Resource Management: Importance of HRM, HRM Vs PMIR (Personnel Management and Industrial Relations), Functions of HR Manager: Man power planning, Recruitment, Selection, Training and Development, Wage and Salary administration, Performance Appraisal, Grievance handling and welfare administration, Job evaluation, and merit rating.

Unit-IV

Project Management(PERT and CPM): Network analysis, Program Evaluation and Review Technique(PERT), Critical Path Method (CPM), Identifying Critical path, Probability of completing the project within given time, Project cost analysis, Project crashing(simple problems).

Unit-V

Strategic Management: Vision, Mission, Goals, Objectives, Policy, Strategy, Programs, Corporate planning process, Environmental scanning, SWOT analysis, Steps in strategy formulation and implementation.

TEXT BOOKS:

1. Harold Koontz, Heinz Weihrich, A.R.Aryasri, Principles of Management, TMH, 2010.
2. K. Aswathappa, "Human Resource Management, Text and Cases", TMH, 2011.
3. Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithleshwar Jha: Marketing Management, 13/e, Pearson Education, 2012.
4. Dipak Kumar Bhattacharyya, Production and Operations Management, Universities Press, 2012.

REFERENCES:

1. Dilip Kumar Battacharya, Principles of Management, Pearson, 2012.
2. Gary Dessler, “Human Resource Management”, 12 Edition, Pearson- 2012.
3. Rajan Saxena: Marketing Management, 4/e, TMH, 2013
4. Aryasri: Management Science, McGraw Hill, 2012

OUTCOMES:

1. To know the basic management practices, functional areas of the organisation which helps the students to build up their career in the corporate world.

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	3	**1/ - /-**	**3**

OPEN ELECTIVE - II

(R15A0069) INTELLECTUAL PROPERTY RIGHTS

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.

TEXT BOOKS:

1. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
2. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.

REFERENCES:

1. Intellectual Property Rights: N K Acharya: ISBN: 9381849309
2. Intellectual Property Rights: C B Raju : ISBN-8183870341
3. Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
4. Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

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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(R15A0483) ELECTRONIC CIRCUITS AND PULSE CIRCUITS LAB

Part - I: Electronic Circuits

Minimum eight experiments to be conducted:

I) 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 Laborataries:

1. For software simultation 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. Reulated 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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(R15A0281) ELECTRICAL TECHNOLOGY LAB

PART – A

1. Verification of KVL and KCL.
2. Series and Parallel Resonance.
3. Determination of two port network parameters – Z and Y Parameters.
4. Determination of two port network parameters – ABCD and h – Parameters.
5. Verification of Superposition and Reciprocity theorems.
6. Verification of Maximum power transfer theorem.
7. Verification of Thevenin's and Norton's theorems.

PART – B

8. Magnetization characteristics of DC shunt generator.
9. Swinburne's test on DC shunt machine.
10. Brake test on DC shunt motor.
11. OC & SC tests on single phase transformer.
12. Load test on single phase transformer.

Note: Any **10** of the above experiments are to be conducted

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(R15A0006) GENDER SENSITIZATION

(An Activity-based Course)

Course Objectives:

The course objectives are:

1. To develop students sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

Unit-I:

UNDERSTANDING GENDER:

Gender: Why should we study It?(Towards a world of Equals: Unit-1)

Socialization: Making Women, making Men(Towards a world of Equals:Unit-2)

Introduction. Preparing for Womanhood. Growing up male, First lessons in /caste, Different Masculinities.

Just Relationships: Being Together as Equals(Towards a World of Equals:Unit-12)

Mary Kom and Onler, Love and Acid just do not Mix, Love Letters, Mothers and Fathers, Further Reading: Rosa Parks-The Brave Heart.

Unit-II:

GENDER AND BIOLOGY:

Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit-4)

Declining Sex Ratio, Demographic Consequences.

Gender Spectrum : Beyond The Binary(Towards a World of Equals: Unit-10)

Two or Many? Struggles with Discrimination

Additional Reading : Our Bodies, Our Bodies, Our Health(Towards a World of Equals: Unit-13)

Unit-III:

GENDER AND LABOUR:

Housework: the Invisible Labour(Towards a World of Equals: Unit-3)

" My Mother doesn't Work." " Share the Load"

Women's Work: Its Politics and Economics(Towards a World of Equals: Unit-7)

Fact and Fiction Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit-IV:

ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (Towards a World of Equals: Unit-6)

Sexual Harassment,not-eve-teasing-coping with everyday harassment-further Reading: " Chupulu".

Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8)

Is Home a safe Place?-When Women Unite(Film). Rebuilding Lives. Further Reading: New Forums for Justice.
Thinking about Sexual Violence (Towards a World of Equals: Unit-11)
Blaming the Victim-"I fought for my Life…"- Further Reading: The Caste Face of Violence

Unit-V:

GENDER STUDIES:

Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit-5)
Point of View, Gender and the Structure of Knowledge. Further Reading : Unackowledged Women Artists of Telengana.
Whose History? Questions for Historians and others(Towards a World of Equals: Unit-9)
Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading : All The Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

REFERENCE BOOKS:

1. Sen, Amartya, " More than One Million Women are Missing," New York Review of Books 37.20(20 December 1990) Print ' We were Making History…' Life Stories of Women in Telangana Peoples Struggle , New Delhi: Kali for Women,1989.
2. Tripti Lahiri " By the Numbers: Where Indian Women Work " Womens Studies Journal (14 November 2012) Available Online at: http://blogs,wsj.com/India real time/2012/11/14/by- the numbers-where-Indian-women-work/>
3. K. Satyanarayana and Susie Tharu(Ed) Steel Nibs are Sprouting: New Dalit Writing from South India, Dossier 2: Telugu And Kannada http://harpercollins.co.in/BookDetail.asp?Book Code-3732
4. Vimala 'Vantillu (The Kitchen)" Women Writing in India:600 BC to the Present Volume II: The 20th Century.Ed.Susie Tharu and K. Lalita Delhi: Oxford University Press,1995 559-601
5. Shatrughuna, Veena et al Womens Work and its Impact on child Health and Nutitution, Hydeabad, National Institute of Nutrition, India Council of Medical Research,1993.
6. Stree Shakti Sanghatana "We were making history…' Life Life Stories of Women in Telangana Peoples Struggle , New Delhi: Kali for Women,1989.
7. Menon, Nivedita Seeing like a feminist, New Delhi: Zubaan-Penguin Books,2012.
8. Jayaprabha, A. 'Chupulu(stares), Women Writing in India:600 BC to the Present Volume II: The 20th Century.Ed.Susie Tharu and K. Lalita Delhi: Oxford University Press,1995 596-697
9. Javeed, Shayan and Anupam Manuhaar " Women and Wage Discrimination in India: A Critical Analysis"International Journal of Humanities and social science Invention2.4(2013)

10. Gautam, Liela and Gita Ramaswamy " A Conversation between a Daughter and a mother" Broardsheet on Contemporary Politics, Special Issue on Sexuality and Harassment : Gender Politics on Campus Today Ed Madhumeeta Sinha and Asma Rasheed Hyderabad: Anveshi Research Center for Women's Studies 2014
11. Abdulali Sohaila " I fought for my life and Won" Available online at : http://www.thealterative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
12. Jeganathan Pradeep,Partha Chatterjee (ED) " Community, Gender and Violence Subaltern Studies Xf Permanent Black and Ravi Dayal Publishers, New Delhi,2000.
13. K. Kapadia, The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India London: Zed Books,2002
14. S. Benhabib, Situating the Self: Gender, Community and Post modernism in contemporary Ethics, London: Routledge,1992
15. Virginia Woolf, A Room of One's own Oxford: Black Swan 1992
16. T. Banuri and M. Mahmood , Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press,1997.

Course Outcomes:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and Women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women thetextbook will empower students to understand and respond to gender violence.

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(R15A0408) IC APPLICATIONS

OBJECTIVES

The main objective 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 teach the theory of ADC and DAC.
4. To introduce the concepts of waveform generation and introduce some special function ICs.
5. To understand and implement the working of basic digital circuits.

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, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Parity 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, conversion of Flipflops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS :

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 2003.
3. Digital fundamentals – Floyd and Jain, Pearson Education,8th Edition ,2005.

REFERENCE BOOKS:

1. Op Amps & Linear Integrated circuits-Concepts and Applications James M.Fiore,Cengage Learning/Jaico,2009.
2. Operational Amplifiers with linear integrated circuits by K.Lal kishore-Pearson,2009.
3. Linear integrated circuits and applications-Salivahana,TMH.
4. Modern digital electronics-RP Jain-4/e-TMH,2010.
5. Digital design principles and practices-John.F.Wakerly 3/e,2005.
6. Operational amplifiers with linear integrated cuircuits,4/e William D.Stanley,Pearson education India,2009.

OUTCOMES:

On completion of this course, the students will have:

1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Understanding of the different families of digital integrated circuits and their characteristics.
3. Also students will be able to design circuits using operational amplifiers for various applications.

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(R15A0409) ANALOG COMMUNICATIONS

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

OUTCOMES

1. Upon completion of the subject, students will be able:
2. Conceptually understand the baseband signal and system
3. Identify various elements, processes and parameters in telecommunication systems and describe their functions, effects and inter relationship
4. Design procedure of AM transmission and reception, analyze, measure and evaluate the performance of the telecommunication system against given criteria
5. Understand basic knowledge of FM transmission and reception Design typical telecommunication systems that consists of basic and essential building blocks

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

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(R15A0569) 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 hierarchial 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 Memmory, Demand Paging, Page-Replcement 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, 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 through 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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(R15A0410) DIGITAL DESIGN THROUGH VERILOG

OBJECTIVE:

This course teaches:

1. Designing digital circuits, behavior and RTL modeling of digital circuits using verilog HDL, verifying these Models and synthesizing RTLmodels to standard cell libraries and FPGAs.
2. Students aim practical experience by designing, modeling, implemeting and verifying several digital circuits.

This course aims to provide students with the understanding of the different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided software tools. Design digital components and circuits that are testable, reusable, and synthesizable.

UNIT - I:

IntroductiontoVerilLog HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Function Verification, System Tasks, Programming Language Interface, Module, Simulation and Synthesis Tools

Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Operators.

UNIT - II:

Gate Level Modeling: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip-Flops with Gate Primitives, Delay, Strengths and Construction Resolution, Net Types, Design of Basic Circuit.

Modeling at Dataflow Level: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vector, Operators.

UNIT - III:

Behavioral Modeling: Introduction, Operations and Assignments, 'Initial' Construct, Assignments with Delays, 'Wait ‘Construct, Multiple Always Block, Design at Behavioral Level, Blocking and Non-Blocking Assignments, The 'Case' Statement, 'If' an 'if-Else' Constructs, 'Assign- De-Assign' Constructs, 'Repeat' Construct, for loop, 'The Disable' Construct, 'While Loop', Forever Loop, Parallel Blocks, Force-Release, Construct, Event.

UNIT - IV:

Switch Level Modeling: Basic Transistor Switches, CMOS Switches, Bidirectional Gates, Time Delays with Switch Primitives, Instantiation with 'Strengths' and 'Delays' Strength Contention with Tri reg Nets.

System Tasks, Functions and Compiler Directives: Parameters, Path Delays, Module Parameters. System Tasks and Functions, File Based Tasks and Functions, Computer Directives, Hierarchical Access, User Defined Primitives.

UNIT - V:

Sequential Circuit Description: Sequential Models - Feedback Model, Capacitive Model, Implicit Model, Basic Memory Components, Functional Register.

Components Test and Verification: Test Bench - Combinational Circuits Testing, Sequential Circuit Testing, Test Bench Techiniques,Desin Verification, Assetion Verification.

TEXT BOOKS:

1. T.R. Padmanabhan, B Bala Tripura Sundari, Design Through Verilog HDL, Wiley 2009.
2. Zainalabdien Navabi, Verliog Digital System Design,TMH, 2nd Edition.

REFERENCE BOOKS:

1. Fundamentals of Digital Logic with Verilog Design - Stephen Brown,Zvonkoc Vranesic, TMH, 2nd Edition.
2. Advanced Digital Logic Design using Verilog, State Machines & Synthesis for FPGA - Sunggu Lee, Cengage Learning, 2012.
3. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.
4. Advanced Digital Design with Verilog HDL - Michel D. Ciletti, PHI,2009.

OUTCOMES

1. By the end of the course student should be able to:
2. Describe Verilog HDL
3. Design Digital circuits
4. Write behavior model of digital circuits
5. Write RTL models of digital circuits
6. Verify behavior and RTL models
7. Describe standard Cell Librarioes and FPGAs
8. Synthesize RTL models to standard cell libraries and FPGAs

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CORE ELECTIVE – I

(R15A0411) DIGITAL SYSTEM DESIGN

UNIT -I:

Minimization and Transformation of Sequential Machines: The Finite State Model – Capabilities and limitations of FSM –State equivalence and machine minimization – Simplification of incompletely specified machines-Merger chart methods- Concept of Minimal Cover Table-Compatibility Graph.

UNIT -II:

Fundamental mode model –Flow table –State reduction – Excitation and output Tables- Primitive Flow Table-Races- Cycles- Hazards- Design of Hazard free cirucits.

UNIT III:

Digital Design: Digital Design Using ROMs, PALs, BCD Adder, 32 –bit adder- PLA-PLA minimization-PLA Folding-Foldable Compatibility Matrix-Examples.

UNIT -IV:

Faults in Digital Circuits: Failures and Faults-Modelling of Faults-Single stuck at fault model – Multiple stuck at fault models –Stuck Open Faults-Bridging fault model. Fault diagnosis of combinational circuits by conventional methods –Path sensitization techniques, Boolean Difference method –Kohavi algorithm-examples.

UNIT -V:

SM Charts: State machine charts, Derivation of SM Charts, Realization of SM Chart, Implementation of Dice Game, and Binary Multiplier.

TEXT BOOKS:

1. Fundamentals of Logic Design –Charles H. Roth, 5th Ed., Cengage Learning.
2. Switching Theory and Logic Design –A. Anand Kumar, PHI
3. Logic Design Theory –N. N. Biswas, PHI

REFERENCE BOOKS:

1. Switching and Finite Automata Theory –Z. Kohavi , 2 nd Ed., 2001, TMH
2. Digital Design –Morris Mano, M.D.Ciletti, 4th Edition, PHI.
3. Digital Circuits and Logic Design –Samuel C. Lee , PHI
4. Fault tolerant and fault testable hardware design Parag K. Lala

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CORE ELECTIVE – I

(R15A0412) DESIGN OF FAULT TOLERANCE SYSTEMS

OBJECTIVES:

1. To create understanding of the fundamental concepts of fault-tolerance
2. To learn basic techniques for achieving fault-tolerance in electronics, communication and software systems
3. To develop skills in modeling and evaluating fault-tolerant architectures in terms of reliability, availability and safety
4. To gain knowledge in sources of faults and means for their prevention and forecasting
5. To understand merits and limitations of fault-tolerant design

UNIT – I: Fault Tolerant Design

Basic Concepts: Reliability Concepts, Failure & Faults, Reliability and Failure rate, Relation between Reliability and Meantime between failure, Maintainability and Availability, Reliability of series, Parallel and Parallel-Series combinational circuits

Fault Tolerant Design : Basic Concepts – Static, dynamic, Hybrid Triple Modular Redundant System, Self purging redundancy, SIFT out redundancy (SMR), 5 MR Re-Configuration techniques, Use of Error Correcting codes, Time redundancy and software redundancy

UNIT – II: Self Checking Circuits & Fail Safe Design

Self Checking circuits: Basic concepts of self checking circuits, Design of Totally self checking checker, checkers using m out of n codes, Berger code, Low cost residue code

Fail Safe Design: Strongly fault secure circuits, fail safe design of sequential circuits using partition theory and Berger code

UNIT – III ATPG Fundamentals & Design for Testability for Combinational Circuits

Introduction to ATPG, ATPG Process – Testability and Fault analysis methods – Fault masking, Transition delay fault, Path delay

Design for Testability for Combinational Circuits: Basic concepts of Testability, Controllability and Observability, The Reed Muller's expansion technique, OR-AND-OR Design, Use of control and Syndrome Testable Designs

UNIT – IV Scan Architectures & Techniques

Introduction to Scan Based testing, Functional testing, The Scan effective Circuit, The MUX-D Style Scan flip-flops, The Scan shift register, Scan cell operation

Scan Test Sequencing, Scan test timing, Partial Scan, Multiple Scan Chains, Scan based Design rules (LSSD), At-speed scan testing and Architecture, multiple clock and scan domain operation, critical paths for at speed scan test

UNIT – V Built in Self Test (BIST)

BIST concepts, Test Pattern generation for BIST exhaustive testing, Pseudorandom testing, pseudo exhaustive testing, constant weight patterns, Generic offline BIST architectures, Memory Test architecture, BILBO

TEXT BOOKS:

1. Fault Tolerant & Fault Testable Hardware Design – Parag K. Lala, 1984, PHI.
2. Design for Test for Digital IC's and Embedded Core Systems – Alfred L. Crouch, 2008,Pearson Education.

REFERENCES:

1. Digital Systems Testing and testable Design – Miron Abramovici, Melvin A. Breuer and Arthur D. Friedman, Jaico Books
2. Essentials of Electronic Testing - Bushnell & Vishwani D.Agarwal, Springers.

OUTCOMES

On completion of this course, it is expected that the student will be able to:

1. Understand the fundamental concepts of fault-tolerance
2. Learn basic techniques for achieving fault-tolerance in electronics, communication and software systems
3. Develop skills in modeling and evaluating fault-tolerant architectures in terms of reliability, availability and safety
4. Gain knowledge in sources of faults and means for their prevention and forecasting
5. Understand merits and limitations of fault-tolerant design

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CORE ELECTIVE – I

(R15A0204) DIGITAL CONTROL SYSTEMS

OBJECTIVE:

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.

THE 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,Springer1st edition.
5.Digital control systems by R.Isermann, Springer; 1st edition.

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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OPEN ELECTIVE – III

(R15A0507) JAVA PROGRAMMING

OBJECTIVES:

1. The objective of this course is to provide object oriented concepts through which robust, secured and reusable software can be developed.
2. To understand object oriented principles like abstraction, encapsulation, inheritance, polymorphism and also fundamentals of object-oriented programming in Java, including objects, classes, and interfaces.
3. To provide the Knowledge in Packages, Exception handling, Multithreading.
4. To Explore AWT and Applets to create GUI applications.
5. To give the students the ability to use the potential benefits of object-oriented programming for solving complex problems efficiently.

UNIT I :

Object oriented thinking :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts

Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, String handling

UNIT II:

Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, Object class

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, package java.io – File, Byte Streams, Character Streams, Stream I/O.

UNIT III:

Exception handling - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Package java.util-Collections Framework: Collection Interface: Queue, Collection class:LinkedList,Stack class, StringTokenizer, Date, Random, Scanner.

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

UNIT IV:

Enumerations, auto boxing Generics –A simple generics example.

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.
AWT: class hierarchy, component, container, panel, window, frame, canvas, graphics. Layout Manager – layout manager types – boarder, grid, flow, card and grib bag.

UNIT V:
AWT controls: Labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar.
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Swing – Introduction, limitations of AWT, MVC architecture, components, containers.

TEXT BOOKS:
1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.

REFERENCES:
1. Thinking in Java 4th Edition, Bruce Eckel
2. Introduction to Java programming, Y. Daniel Liang, pearson education.
3. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education.

OUTCOMES
Upon completion of the course, the student will be able to:
1. Understand object oriented concepts through which robust, secured and reusable software can be developed.
2. Understand object oriented principles like abstraction, encapsulation, inheritance, polymorphism and also fundamentals of object-oriented programming in Java, including objects, classes, and interfaces.
3. Learn the Knowledge in Packages, Exception handling, Multithreading.
4. Explore AWT and Applets to create GUI applications.
5. Learn the potential benefits of object-oriented programming for solving complex problems efficiently.

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OPEN ELECTIVE – III

(R15A0520) WEB TECHNOLOGIES

OBJECTIVES:

1. Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.
2. It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side
3. Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications,
4. Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

UNIT I:

HTML Common tags: List, Tables, images, forms, Frames; Cascading Style sheets. Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

UNIT II:

Introduction to XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX. Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB's.

UNIT III:

Web Servers and Servlets: Tomcat web server, Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax. Servlet Package, Reading Servlet 150 parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Accessing a Database from a Servlet. Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment.

UNIT V:

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing : Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations, Accessing a Database from a JSP page, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNIT s 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
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
4. Jakarta Struts Cookbook, Bill Siggelkow, S P D O'Reilly for chap 8.
5. March's beginning JAVA JDK 5, Murach, SPD
6. An Introduction to Web Design and Programming –Wang-Thomson

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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OPEN ELECTIVE – III

(R15A0536) ARTIFICIAL INTELLIGENCE

OBJECTIVES:

To illustrate

1. The most important as well as lasting ideas in artificial intelligence, Neural networks, genetic programming, computer vision, heuristic search, knowledge representation and reasoning,
2. Bayes networks, planning, and language understanding are each revealed through the growing field.
3. The subject provides a refreshing and motivating new synthesis of the field by one of AI's master expositors and leading researchers. "Artificial Intelligence: A New Synthesis" takes the reader on a complete tour of this intriguing New World of AI.

UNIT I

Introduction

Definition of Artificial Intelligence, subfields of AI, Intelligent Action, Search, Knowledge Representation.

UNIT II

The Search

Search, Blind search, Breadth First, Depth First, Heuristic Search, search as Function maximization, Adversary Search.

UNIT III

Logistics

Knowledge Representation, Predicate logic, First Order Logic, Databases with quantifiers

UNIT IV

Learning Methods

Learning Methods, Learning by building identification trees, Learning by training neural networks.

UNIT V

Processing

Natural Language Processing, Signal Processing, syntax and Parsing, semantics and meaning.

TEXT BOOKS/ REFERENCE BOOKS

1. Essentials of Artificial Intelligence - Matt Ginsberg, Matthew L. Ginsberg –Morgan Kaufmann, 1993.
2. Stuart Russel, Peter Norvig "Artificial Intelligence - A Modern Approach", 3e, PHI, 2009
3. Elain Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, 1993
4. Artificial Intelligence, Patrick Henry Winston, Addison-Wesley Pub Co, 3rd edition, 1992.

OUTCOMES

At the end of the course the student should be able to understand artificial intelligence, Neural networks, genetic programming, computer vision, heuristic search, knowledge representation and reasoning.

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(R15A0484) IC APPLICATIONS AND HDL SIMULATION 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, Squarewave 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 demuliplexer.
5. Design of 4 bit binary to gray code converter
6. Design of 4 bit comparator
7. Design of Full adder using 3 modelling styles
8. Design of flip flops: SR, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)

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(R15A0485) 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 I 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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MANDATORY COURSE – III

(R15A0007) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.

b. To equip the students to approach academic subjects more professionally using the theoretical and practical components of the English syllabus.

c. To develop the professional skills and communication skills in formal and informal situations and hone the required professional ethics.

SYLLABUS

Unit- 1: Factors affecting information and document design, Principles of effective writing , Technical Writing, Grammar and Editing- Technical writing process, Writing drafts and revising, Collaborative writing, technical writing style and language.

Unit- 2: Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication.

Unit-3: Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids. Writing reports, Email writing, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Unit- 4: Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, self esteem.

Unit- 5: Ethics- Business ethics, , Personality Development in social and office settings, netiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Rapid reading, Complex problem solving, Creativity, leadership skills ,cubicle Etiquettes, team building.

Text 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)

Reference Books:

1. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
2. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
3. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

OUTCOMES:

1. The student will become proficient in LSRW skills.
2. They develop formal LSRW skills approach to different situations.
3. They hone professional ethics and learn to be proficient formally.

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(R15A0413) DIGITAL COMMUNICATIONS

OBJECTIVES:

1. To understand the building blocks of digital communication system.
2. To prepare mathematical background for communication signal analysis.
3. To understand and analyze the signal flow in a digital communication system.
4. To analyze error performance of a digital communication system in presence of noise and other interferences.

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).Certain Issues in Digital Transmission,Time Division Multiplexing & Demultiplexing.

Delta Modulation : Delta modulation, its draw backs, 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, non-coherent detection of FSK.

Data Transmission : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter. 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 : Introductions, Advantages, Shannon's theorem, Shanon- Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off. Illustrative Problems.

UNIT VII

Linear Block Codes : Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes.

Convolution Codes : Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram. Illustrative Problems.

TEXT BOOKS :

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCES :

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.

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
5. Understand the advantages spread spectrum techniques and performance of sprewad spectrum, PN codes in jamming and noise etc

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(R15A0414) MICROPROCESSORS AND MICROCONTROLLERS

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.

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.

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. The student will learn hardware and software interaction and integration.
3. The students will learn the design of microprocessors/microcontrollers-based systems

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(R15A0415) DIGITAL SIGNAL PROCESSING

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 to Digital Signal Processing: 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.

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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(R15A0416) ANTENNAS AND WAVE PROPAGATION

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
4. Formulation of the analysis.
5. To have knowledge on antenna operation and types as well as their usage in real time filed.
6. 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.

Fields from Oscillating Dipole, 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. Loop Antennas - Introduction, Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances.

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:

Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics, 103 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, EFA with Increased Directivity, 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., 2000. 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.

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 electro magnetic waves

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CORE ELECTIVE – II

(R15A0417) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

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 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, Power 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, Digital Temperature sensing system, 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.

REFERENCES:

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.

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. Understand principle of operation and working of different electronic instruments
6. Students will understand functioning, specification and application of signal analyzing instruments

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CORE ELECTIVE – II

(R15A0418) OPTICAL COMMUNICATIONS

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. [2]. 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 Photodetectors. 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.

RERFERENCES :

1. 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.

OUTCOMES:

1. At the end of the course the student will be able to:
2. Understand and analyze the constructional parameters of optical fibers.
3. Be able to design the optical system.
4. Estimate the losses due to attenuation, absorption, scattering and bending.
5. Compare various optical detectors and choose suitable one for different applications.

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CORE ELECTIVE – II

(R15A0419) DATA COMMUNICATIONS

COURSE OBJECTIVE:

Data communications and networking is the fastest growing technologies in our culture today. The course attempts

1. To provide a unified overview of the broad field of data and computer communications.
2. Emphasizes basic principles and topics of fundamental importance concerning the technology and architecture of this field
3. Provides a detailed discussion of leading edge topics.

UNIT I:

INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING: Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks, Alternate Protocol Suites.

SIGNALS, NOISE, MODULATION, AND DEMODULATION: Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and M-ary Encoding, Digital Modulation.

UNIT II:

METALLIC CABLE TRANSMISSION MEDIA : Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Losses.

OPTICAL FIBER TRANSMISSION MEDIA : Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

DIGITAL TRANSMISSION : Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ration, Companding, PCM Line Speed, Time-Division Multiplexing, Frequency- Division Multiplexing, Wavelength- Division Multiplexing

Unit III:

WIRELESS COMMUNICATIONS SYSTEMS: Electromagnetic Polarization, Rays and Wavefronts, Electromagnetic Radiation, wave Attenuation and Absorption, Microwave Communications Systems, Satellite Communications Systems.

TELEPHONE INSTRUMENTS AND SIGNALS: The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

THE TELEPHONE CIRCUIT: The Local Subscriber Loop, Units of Powers Measurement, Voice-Frequency Circuit Arrangements, Crosstalk.

CELLULAR TELEPHONE SYSTEMS:

First- Generation Analog Cellular Telephone, Personal communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, North

American Cellular and PCS Summary, Global system for Mobile Communications, Personal Communications Satellite System.

Unit IV:

DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS: Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

Unit V:

DATA COMMUNICATIONS EQUIPMENT: Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems- Compatible Voice- Band Modems, Voice- Band Modern Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, Cable Modems, Probability of Error and Bit Error Rate.

DATA –LINK PROTOCOLS: Data –Link Protocol Functions, Character –and Bit- Oriented Protocols, Data Transmission Modes, Asynchronous Data – Link Protocols, Synchronous Data – Link Protocols, Synchronous Data – Link Control, High – Level Data – Link Control.

TEXT BOOKS:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

Reference Books

1.Data Communications and Networking, Behrouz A Forouzan, Fourth Edition.TMH.
2.Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
3. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education

OUTCOMES

Upon completion of the subject, the student will be able to:

1. Understand unified overview of the broad field of data and computer communications.
2. Emphasizes basic principles and topics of fundamental importance concerning the technology Understand the architecture of this field
3. Learn detailed discussion of leading edge topics.

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OPEN ELECTIVE – IV

(R15A0509) DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

1. To design DBMS and explain its significance in IT projects
2. To design ER diagrams
3. To develop RDBMS relation schemas from ER diagrams
4. To develop queries for user required screens and reports and develop SQLs
5. To develop concurrent queries and optimize them using queries manually

UNIT I :

Data base 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 for applications Programs – data base Users and Administrator – Transaction Management – data base Architecture – Storage Manager – the Query Processor

Data base design and ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design for University Enterprise.

Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams

UNIT II :

Relational Query Languages, Relational Operations.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus.

Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers.

UNIT III:

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyee/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.

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems-Remote Backup systems.

UNIT V :

File organization:– File organization – various kinds of indexes. Query Processing – Measures of query cost - Selection operation – Projection operation, - Join operation – set operation

and aggregate operation – Relational Query Optimization – Transacting SQL queries – Estimating the cost – Equivalence Rules.

TEXT BOOKS :

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.(All UNITS except III th)
2. Data base Management Systems, Raghurama Krishnan, 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:

1. Student can define ER model for mini and main projects
2. Student can develop RDBMS relation schemas from ER diagrams
3. Student can develop queries required

Student can develop concurrent queries and optimize them using queries manually

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OPEN ELECTIVE – IV

(R15A0543) SOFTWARE PROJECT MANAGEMENT

OBJECTIVES:

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 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. Software Project Management, *Walker Royce,* Pearson Education.
2. Managing the Software Process, *Watts S. Humphrey*, 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.

OUTCOMES

Upon completion of the subject, the student be able to:

1. Understand 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 resources with the Application of suitable project management tools.

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OPEN ELECTIVE –IV

(R15A0568)APPS DESIGN AND DEVELOPMENT

Objectives:

1. Knowledge of basic software engineering fundamentals and practices.
2. Introducing multimedia practices and graphic fundamental.
3. Knowledge of basic java programming under client/server side and data base connection.

UNIT – I: Fundamental concepts

Software myths, Process models**:** The waterfall model, Incremental process models, Evolutionary process models, The Unified process. Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics.

UNIT – II: HTML Common tags

List, Tables, images, forms, Frames; Cascading Style sheets.

UNIT - III : Introduction to Java Scripts

Objects in Java Script, Dynamic HTML with Java Script.

UNIT - IV : Web Servers

Introduction to Servlets: Lifecycle of a Servlet, The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing, Environment: Installing the Java: Software Development Kit, Tomcat Server. Using Cookies-Session Tracking, Security Issues.

UNIT - V : Database Access

Database Programming using JDBC, Studying Javax.sql.* package, Accessing a Database from a JSP Page, TESTING: Types of software testing ,test cases.

TEXT BOOKS:

1. Web Programming ,Building Internet Applications, CHRIS BATES Ii Edition, Wiley Dreamtech.
2. Programming world wide web ,SEBESTA,PEARSON.

REFERENCES:

1. Core Servlets And Java Servlets Pages Vol-1:Core Technologies BY MARTY HALL,LARRY BROWN PEARSON.
2. Software Engineering ,ROGERS PRESSMEN,TATA McGraw-HILL.
3. Software Testing Techniques, BORIS BEIZER,DREAMTECH,II EDITION.
4. Java Complete Reference ,7^{TH} EDITION ,HERBERTSCHILDT,TMH.

Outcomes

1. Ability to identify the minimum requirements for the development of application.
2. Ability to apply different multimedia development tools to produce web based and stand-alone user interfaces.
3. Gain knowledge of client side scripting, understanding of server side scripting with java.

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(R15A0486) MICROPROCESSORS AND MICROCONTROLLERS LAB

OBJECTIVES:

1. To develop and execute variety of assembly language programs of Intel 8086 including arithmetic and logical, sorting, searching, and string manipulation operations.
2. To develop and execute the assembly language programs for interfacing Intel 8086 with peripheral devices.
3. To develop and execute simple programs on 8051 micro controller.

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.

Note:- Minimum of 12 experiments to be conduct

OUTCOMES:

After going through this course the student will be able to

1. To apply the concepts in the design of microprocessor/microcontroller based systems in real time applications

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III Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
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(R15A0487) 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.

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	5	**-/ - /-**	**4**

(R15A0420) VLSI DESIGN

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.

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
5. 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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(R15A0421) MICROWAVE ENGINEERING

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.

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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(R15A0422) CELLULAR AND MOBILE COMMUNICATIONS

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:

Measurment of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects, diversity techniques: Space Diversity ,Polarization diversity, frequency diversityand 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.

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, diversity techniques and mobile antennas
5. The student will be able to understand the frequency management, channel assignment and types of handoffs

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(R15A0514) COMPUTER NETWORKS

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 the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced Courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design 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, addressmapping, 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, Pearson Education
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

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 the most 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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CORE ELECTIVE – III

(R15A0423) SATELLITE COMMUNICATIONS

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.

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.,
5. Students will understand the various multiple access systems for satellite communication systems and satellite packet communications.

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CORE ELECTIVE – III

(R15A0424) EMBEDDED SYSTEMS DESIGN

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

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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CORE ELECTIVE – III

(R15A0425) 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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CORE ELECTIVE - IV

(R15A0426) 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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CORE ELECTIVE – IV

(R15A0427) SPEECH PROCESSING

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

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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CORE ELECTIVE – IV

(R15A0428) MULTIMEDIA AND SIGNAL CODING

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.

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 knowledge to specific multimedia related problems and projects at work

6. Take advance courses in this area.

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(R15A0488) 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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(R15A0489) MICROWAVE AND DIGITAL COMMUNICATIONS LAB

LIST OF EXPERIMENTS

Part – A (Any 6 Experiments) :

1. Characteristics of gunn diode
2. Characteristics of the reflex klystron tube
3. Attenuation measurement
4. Impedance measurement
5. Frequency measurement
6. Characteristics of multihole directional coupler
7. Determination of standing wave ratio and reflection coefficient
8. Measurement of waveguide parameters
9. Study of magic tee
10. Study of circulator

Part – B (Any 6 Experiments):

1. Time Division Multiplexing and Demultipluxing
2. Amplitude shift keying modulation & demodulation
3. Frequency shift keying modulation & demodulation
4. Phase shift keying modulation & demodulation
5. Differential phase shift keying modulation & demodulation
6. Pulse code modulation & demodulation
7. Differential pulse code modulation & demodulation
8. Delta modulation & demodulation

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
17. Matched Loads

Equipment required for Digital Communications Lab:

1. TDM,ASK,FSK,PSK,PCM,DPCM,DPSK,DM Modulation & Demodulation Kits
2. Digital Storage Oscilloscopes, Coaxial Probes, Patch Cords

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CORE ELECTIVE – V

(R15A0429) RADAR SYSTEMS

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 AlarmTime 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.

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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CORE ELECTIVE – VII

(R15A0430) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

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

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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CORE ELECTIVE - V

(R15A0431) 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.

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CORE ELECTIVE – VI

(R15A0432) WIRELESS COMMUNICATIONS AND NETWORKS

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.

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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CORE ELECTIVE – VI

(R15A0573) 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 TR Padmanabhan.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

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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IV Year B.Tech. ECE-II Sem	**L**	**T/P/D**	**C**
	5	**-/ - /-**	**4**

CORE ELECTIVE – VI

(R15A0433) TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

OBJECTIVES:

The following are the course objectives:

1. To learn Switching, Signaling and traffic in the context of Telecommunication network.
2. To expose through the evolution of switching systems from manual and electromechanical systems to stored-program-controlled digital systems
3. To study signaling, packet switching and networks

UNIT - I:

Switching Systems: Evolution of Telecommunications; Basics of a switching systems; Function of a switching system; Crossbar switching- Principal of crossbar switching; Crossbar switch configuration; Cross-Point technology; Crossbar exchange Organization; A General Trunking; Electronic switching; Digital switching systems.

Telecommunications Traffic: Introduction; The Unit Of Traffic; Congestion; Traffic Measurement; A mathematical model ; Lost-call Systems-Theory; Traffic Performance; Loss systems in Tandem; Use of Traffic tables; Queuing Systems-The Second Erlang Distributions; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

UNIT - II:

Switching Networks: Single Stage Networks; Grading-Principle Two Stage Networks; Three stage networks; Four stage Networks

Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching.

Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control Reliability; Availability and Security; Stored Program Control.

UNIT - III:

Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems- Outband Signaling; Inband (VF) Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCITT Signaling System Number 6; CCITT Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT - IV:

Packet Switching: Introduction; Statistical Multiplexing; Local Area and Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT – V:

Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

TEXT BOOKS :

1. J. E Flood, "Telecommunications Switching and Traffic Networks", Pearson Education, 2006
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks", Prentice Hall of India Pvt. Ltd., 2006

REFERENCE BOOKS:

1. John C Bellamy, "Digital Telephony", John Wiley International Student Student Edition, 3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi, "Introduction to Data Communication and Networking", Pearson Education, 1st Edition, 2007

OUTCOMES:

On completion of this course, it is expected that the student will be able to:

1. Understand the main concepts of telecommunication network Design
2. Analyse and evaluate fundamental telecommuinication traffic models.
3. Understand basic modem signaling system.
4. Solve traditional interconnection switching system design problems.
5. Understand the concept of packet switching