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)
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BACHELOR OF TECHNOLOGY ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE

(Batches admitted from the academic year 2022 - 2023)

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B TECH ELECTRICAL & ELECTRONICS ENGINEERING- COURSE STRUCTURE

II Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0025	Numerical Methods and Complex variables	3	1	0	**4**	40	60
2	R22A0202	Electrical Machines-I	3	1	0	**4**	40	60
3	R22A0204	Electrical Circuit Analysis	3	0	0	**3**	40	60
4	R22A0205	Power System-I	3	0	0	**3**	40	60
5	R22A0207	Electro Magnetic Fields	3	0	0	**3**	40	60
6	R22A0282	Electrical Machines Laboratory-I	0	0	2	**1**	40	60
7	R22A0284	Electrical Circuits Analysis Lab	0	0	2	**1**	40	60
8	R22A0285	Electrical Simulation tools Laboratory	0	0	2	**1**	40	60
9	*R22A0005	Foreign Language: French / Gender sensitization Laboratory	0	0	2	**0**	100	-
		Total	15	2	8	**20**	**420**	**480**

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

II Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0353	Solid Mechanics & Hydraulic Machines	3	0	0	**3**	40	60
2	R22A0208	Measurements and Instrumentation	3	0	0	**3**	40	60
3	R22A0203	Electrical Machines–II	3	0	0	**3**	40	60
4	R22A0461	Analog & Digital Electronics	3	0	0	**3**	40	60
5	R22A0206	Power System-II	3	0	0	**3**	40	60
6	R22A0471	Analog & Digital Electronics Laboratory	0	0	2	**1**	40	60
7	R22A0286	Measurements and Instrumentation Laboratory	0	0	2	**1**	40	60
8	R22A0283	Electrical Machines Laboratory- II	0	0	2	**1**	40	60
9	R22A0291	Real-time Research Project/ Field Based Project	0	0	4	**2**	40	60
10	*R22A0061	Public Policy and Governance/Constitution of India	2	0	0	**0**	100	-
		Total	**17**	**0**	**10**	**20**	**460**	**540**

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

III Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0209	Power Electronics	3	0	0	3	40	60
2	R22A0210	Control Systems	3	0	0	3	40	60
3		**Open Elective-I**	3	0	0	3	40	60
4	R22A0211 R22A0212 R22A0213	**PROFESSIONAL ELECTIVE-I** IoT Applications in Electrical Engineering Cyber-Physical Systems Computer Aided Electrical Machine Design	3	0	0	3	40	60
5	R22A0064	Business Economics and Financial Analysis	3	0	0	3	40	60
6	R22A0287	Control Systems Laboratory	-	0	2	1	40	60
7	R22A0288	Power Electronics Laboratory	-	0	2	1	40	60
8	R22A0084	Professional Development skill-I	-	0	2	1	40	60
9	R22A0292	Application Development- I	0	0	4	2	100	0
		Total	**15**	**0**	**10**	**20**	**420**	**480**

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

III Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1		**Open Elective-II**	3	0	0	3	40	60
2	R22A0214 R22A0214 R22A0214	**Professional Elective-II** High Voltage Engineering Power Semiconductor Drives Power System Reliability	3	0	0	3	40	60
3		Digital Signal Processing	3	0	0	3	40	60
4	R22A0217	Power System Protection	3	0	0	3	40	60
5		Microprocessors & Microcontrollers	3	0	0	3	40	60
6	R22A0289	Power Systems Laboratory	-	0	2	1	40	60
7	R22A0488	Microprocessors & Microcontrollers Laboratory	-	0	2	1	40	60
8	R22A0490	Digital Signal Processing Laboratory	0	0	2	1	40	60
9	R22A0293	Application Development- II	0	0	4	2	40	60
10		Environmental Science	2	0	0	0	100	-
		Total	**17**	**0**	**10**	**20**	**360**	**540**

Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.

IV Year B. Tech – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0218	Power Electronic Applications to Renewable Energy Systems	3	1	0	4	40	60
2	R22A0219	Power System Operation and Control	3	0	0	3	40	60
3	R22A0220 R22A0221 R22A0222	**Professional Elective-III** Mobile Application Development Automation with PLC Electric and Hybrid Vehicles	3	0	0	3	40	60
4	R22A0223 R22A0224 R22A0225	**Professional Elective-IV** HVDC Transmission Industrial and Allied Electrical Systems Embedded Systems Applications	3	0	0	3	40	60
5	R22A0226	Wind and Solar Energy systems	3	0	0	3	40	60
6	R22A0290	Simulation of Renewable Energy Systems Laboratory	-	0	2	1	40	60
7	R22A0294	Project Phase - I	-	0	6	3	40	60
		Total	**15**	**1**	**8**	**20**	**280**	**420**

IV Year B. Tech – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1		Innovation, Startup & Entrepreneurship	4	0	0	4	40	60
2	R22A0227 R22A0228 R22A0229	**Professional Elective-V** Power Quality & FACTS Solar Power Batteries AI Techniques in Electrical Engineering	3	0	0	3	40	60
3	R22A0230 R22A0231 R22A0232	**Professional Elective-VI** Smart Grid Technologies Electrical Distribution Systems Machine Learning Applications to Electrical Engineering	3	0	0	3	40	60
4	R22A0295	Project Phase – II	0	0	20	10	80	120
		Total	**10**	**0**	**20**	**20**	**200**	**300**

OPEN ELECTIVES

Open Elective-I:

1	R22A0251	Renewable Energy Sources
2	R22A0551	Java Programming
3		Web Development
4		Intellectual Property Rights
5		Robotics And Automation
6		Electronics For Health Care
7	R22A6751	Principles of Data Science

Open Elective-II:

1	R22A0252	Electrical &Hybrid Vehicles
2		Data Base Systems
3	R22A6753	Big Data Architecture
4		Design Thinking
5		Principles Of Cloud Computing
6	R22A6951	IOT And Its Applications
7	R22A2152	Nano Technology

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

2 /- /-/2

(R22A0001) ENGLISH

INTRODUCTION

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

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

COURSE OBJECTIVES:

1. To enable students to enhance their lexical, grammatical and communicativecompetence.
2. To equip the students to study the academic subjects with better perspective throughtheoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing and to ensure error-free writing
4. To sharpen the speaking skills of learners by involving them in diverse activities such as group discussions, debates, conversations and role plays.
5. To train students in soft skills with the help of case studies.

SYLLABUS

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To augment the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.,

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences
- Scanning the text

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 basic formal writing skills.
2.To equip students with the components of different forms of writing, beginning with the required ones:

- Writing sentences
- Use of appropriate vocabulary
- Coherence and cohesiveness
- Formal and informal letter writing

Unit –I
J K Rowling's Convocation Speech at Harvard
Grammar – Tenses and Question Tags
Vocabulary – word Formation - Affixes Writing
Writing – Paragraph Writing
Reading – The art of skimming and scanning - Reading Exercise Type 1
(Match the statements to the text they refer to)

Unit – II
"The Road not taken" by Robert Frost
Grammar – Direct and Indirect Speech
Vocabulary – One-Word Substitutes, Standard Abbreviations, Synonyms and Antonyms
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Reading –The art of Intensive and Extensive -Reading Exercise Type 2

Unit – III
Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft
Grammar – Voices
Vocabulary – Transitive and Intransitive
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Reading Comprehension- Reading Exercise Type 3 (Reading between the lines)

Unit – IV
"Abraham Lincoln's Letter to His Son's Teacher"
Grammar – Articles, Punctuation
Vocabulary – Phrasal Verbs
Writing – Précis Writing

Reading – Reading Exercise Type 4 (Cloze test)

Unit –V

Abdul Kalam's Biography

Grammar–Subject-Verb Agreement, Noun- Pronoun Agreement Vocabulary–Commonly Confused Words Writing–Memo Writing Reading-Reading Exercise Type 5 (Identifying errors)

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

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. https://www.britannica.com/biography/A-P-J-Abdul-Kalam
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.

COURSE OUTCOMES:

After completion of the course students will be able to:

1. Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of the same
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passiveskills
5. Represent old conventions with a set of the new by professional verbal communicativeability.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/ C**

3/1/-/ 4

(R22A0023)MATHEMATICS –I

COURSE OBJECTIVES: To learn

- The concept of a Rank of the matrix and applying the concept to know the consistency andsolving the system of linear equations.
- The concept of Eigen values, Eigen vectors and Diagonolisation.
- The maxima and minima of functions of several variables.
- The Applications of first order ordinary differential equations.
- The methods to solve higher order differential equations.

UNIT I: Matrices

Introduction, Types of matrices ,Rank of a matrix - Echelon form and Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss elimination method and Gauss-Siedel iteration method.

UNIT II: Eigen values and Eigen vectors

Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties, Diagonalisation of a matrix. Cayley-Hamilton theorem(without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III: Multi Variable Calculus (Differentiation)

Functions of two variables, Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

UNIT IV: First Order Ordinary Differential Equations

Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay, Equations not of first degree- Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type

UNIT V : Differential Equations of Higher Order

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, Equations reducible linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

Text Books

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii) Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons .

Reference Books

i) Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
ii) Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
iii) Engineering Mathematics by N.P Bali and Manish Goyal.

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

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Reduce the quadratic form to canonical form using orthogonal transformations.
3. Find the extreme values of functions of two variables with / without constraints.
4. Solve first order, first degree differential equations and their applications.
5. Solve higher order differential equations.
6. Analyze the nature of sequence and series.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH – I - SEM **L/T/P/C**

3/1/-/4

(R22A0021) APPLIED PHYSICS

COURSE OBJECTIVES:

1 To understand the basic principles of lasers and optical fibers.
2 To interpret dual nature of the matter and behavior of a particle quantum mechanically.
3 To classify the solids depending upon electrical conductivity.
4 To understand the concepts of semiconductors and devices.
5 To analyze dielectric and magnetic properties of the materials.

UNIT – I

LASERS & FIBER OPTICS **(15 Hours)**

Lasers: Characteristics of lasers, Absorption, Spontaneous and stimulated emissions, Einstein's Coefficients, Population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.

Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and index profile,Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

UNIT – II

QUANTUM MECHANICS **(10 Hours)**

Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, Particle in one dimensional square well potential.

UNIT – III

FREE ELECTRON THEORY OF METALS **(12 Hours)**

Free electron theory (Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E –k diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.

UNIT-IV

SEMICONDUCTOR PHYSICS **(15 Hours)**

Intrinsic and Extrinsic semiconductors, Direct and Indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, semiconductor materials for optoelectronic devices - LED, Photo diode, Solar cell.

UNIT – V

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS (12 Hours)

Dielectrics: Introduction, Types of polarizations – Electronic, Ionic and Orientation polarization (qualitative) and calculation of polarizabilities, Internal fields in Solid, Clausius-Mossotti relation, Piezo-electricity and Ferro-electricity.

Magnetism: Introduction, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve based on domain theory, Soft and Hard magnetic materials.

COURSE OUTCOMES:

1 Can apply the principles of laser to understand various lasers and fiber optic systems.

2 Basic principles of quantum mechanics can be used to analyze the microscopic behavior of a particle.

3 Classification of solids can be made by understanding the band structure of solids.

4 Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.

5 Examine dielectric, magnetic properties of the materials and apply them in materialtechnology.

TEXT BOOKS:

1. Engineering Physics by Kshirsagar&Avadhanulu, S. Chand publications.
2. Modern Engineering Physics-Dr K Vijaya Kumar & Dr S Chandralingam, S. ChandPublications.
3. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**
2/0/0/2

(R22A0022) ENGINEERING CHEMISTRY

COURSE OBJECTIVES: The students will be able to

1. Acquire the knowledge of electrochemistry and batteries which are essential for the engineers and in industry.
2. Analyze engineering problems related to corrosion and develop different corrosion control techniques.
3. Identify different types of polymers, composites and their applications in various engineering fields.
4. Gain knowledge on wide variety of advanced materials like nano and smart materials which have excellent engineering properties.
5. Analyze water for its various parameters and its significance in industrial and domestic applications.

Unit I Electrochemistry (8 hours)

Introduction - Types of cells - Electrolytic and Electrochemical cells (construction and working of Galvanic Cell) - Electrode potential- Cell potential (EMF); Nernst equation and its applications; Electrochemical series and its applications. Batteries - Classification of batteries - primary, secondary and fuel cells with examples. Primary cells - Lithium cells; Secondary cells - Lead acid battery and Lithium ion battery; Fuel cells - Differences between battery and a fuel cell; Construction, working and applications of H_2-O_2 fuel cell.

Unit II Corrosion: (8 hours)

Causes and effects of corrosion – Theories of corrosion - Chemical (oxidation) and Electrochemical corrosion – mechanism of electrochemical corrosion (Evolution of Hydrogen and Absorption of Oxygen); Corrosion control methods - Cathodic protection - Sacrificial anode and Impressed current cathodic methods; Surface coatings – methods of application - Electroplating (Cu-plating) and Electroless plating (Ni-plating) - advantages and applications of electroplating/electroless plating.

Unit III Water and its treatment: (8 hours)

Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems; Potable water and its specifications; Disinfectation of water by chlorination and ozonization. Boiler troubles - caustic embrittlement, scales and sludges; External treatment of water – Ion exchange process; Desalination of water – Reverse osmosis.

Unit IV Polymers: (10 hours)

Introduction - Classification of polymers; Types of polymerization - addition and condensation polymerisation with examples. **Plastics** - thermoplastic and thermosetting resins; preparation, properties and engineering applications of Polyvinylchloride (PVC), Teflon (PTFE), and Bakelite. **Rubbers** - Natural rubber and its vulcanization. **Conducting polymers** - classification of conducting polymers – mechanism of conduction in trans-Polyacetylene and applications of conducting polymers. **Bio-degradable polymers** – preparation, properties and applications of Poly-Lactic acid. **Composite materials:** Introduction - Fibre reinforced plastics (FRPs) - Glass fibre reinforced, Carbon fibre reinforced plastics and their applications.

Unit V Advanced Materials: (8 hours)

Nanomaterials: Introduction and classification of nanomaterials; preparation of nanomaterials - Sol-gel method; applications of nanomaterials (industrial and medicinal); Carbon nanotubes (CNTs)-applications.

Smart materials: Introduction - Types of smart materials - examples and applications of piezoelectric materials and shape memory alloys.

Suggested Text Books:

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16thEdition.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited, 2018.
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

Reference Books:

1. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, NewDelhi.
3. P.W. Atkins, J.D. Paula, “Physical Chemistry”, Oxford, 8thedition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, “Principles of Physical Chemistry”, S. Nagin Chand & Company Ltd., 46thedition (2013).

COURSE OUTCOMES: The student will be able to

1. Relate the knowledge of operating principles of various types of electrochemical cells, including batteries, to optimize the need for sustainable development.
2. Analyze and develop technically sound, economic and sustainable solutions for complex engineering problems related to corrosion and its effects.
3. Identify, formulate and develop polymeric compounds used in various engineering materials for futuristic engineering applications.
4. Apply the knowledge of nanotechnology and smart materials to find solutions for various engineering problems.
5. Familiarize with the fundamentals of water treatment technologies and the considerations for its design and implementation in water treatment plants.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

3/-/-/3

(R22A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES:

1. To Understand the use of computer system in problem solving and to build program logic with algorithms and flowcharts.
2. To learn the syntax and semantics of C programming language.
3. To learn the usage of structured programming approach in solving problems.
4. To learn the usage of strings and pointers.
5. Understand the usage of structures and files.

UNIT - I: Introduction to Programming:

Computer Languages, Compilers, Compiling and executing a program, Representation of Algorithms and Flowcharts with examples.

Introduction to C Programming Language:

Structure of a C Program**,** I/O: Simple input and output with scanf() and printf(), C Tokens- Keywords, Identifiers, Constants, Variables, Data types, Operators, Expressions and precedence, Expression evaluation, Type conversion.

UNIT - II: Conditional Branching and Arrays:

Control Structures – Selection Statements (Decision Making)- if and switch statements, nested if-else, Iteration and loops: use of while, do-while and for loops, nested loops, use of goto, break and continue statements.

Arrays: Definition, one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

UNIT - III: Designing Structured Programs using Functions:

Functions: Declaring a function, Categories of functions, passing parameters to functions: call by value, call by reference, passing arrays to functions, Scope- Local Vs Global, Storage classes, Recursion with example programs.

UNIT - IV: Strings and Pointers:

Strings: Introduction to strings, Declaration and Initialization, String input/output functions, String manipulation functions with example programs, Array of Strings.

Pointers: Defining pointers, Declaration and Initialization, accessing variables through pointers, Pointers to arrays, Pointers to functions, Pointers to structures, Command line arguments, Enumeration data type, Dynamic Memory Management Functions: malloc(), calloc(), realloc() and free().

UNIT - V: Structures and File handling in C:

Structures: Defining structures, Declaration and Initialization, Array of structures, unions.

Files: Text and Binary files, Opening and Closing files, File input /output functions, Creating and Reading and writing text files, Appending data to existing files.

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition,Pearson.
2. Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
3. Computer Programming, E.Balagurusamy, First Edition, TMH.
4. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia.
2. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

COURSE OUTCOMES: The student will be able

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in the C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings, structures and files to write C programs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

-/-/3/1.5

(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB

COURSE OBJECTIVES:

1. To experience the mechanical oscillations and resonance phenomena.
2. To verify the concepts of light.
3. To analyze voltage/current phase behavior of RC and LCR circuits.
4. To study the characteristics of semiconductor devices.
5. To understand the concepts of laser.

LIST OF EXPERIMENTS:

1. Melde's experiment –Frequency of electrical vibrator.
2. Newton's Rings –Radius of curvature of Plano convex lens.
3. Laser -Wave length of light by using Diffraction grating.
4. CR circuit – Time constant of RC circuit.
5. LCR Circuit- Quality factor and resonance frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Torsional pendulum- Rigidity modulus of given wire (demonstrative).
10. Hall Effect – Hall coefficient of semiconducting samples (demonstrative).

REFERENCE BOOKS:

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S. Publications.
2. Engineering physics practical lab manual – MRCET

COURSE OUTCOMES:

1. Students can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wavelength of the given laser can be determined by using diffraction phenomenon
4. By understanding electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. V-I characteristics of various semiconductor devices can be illustrated.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

-/-/3/1.5

(R22A0082) ENGINEERING CHEMISTRY LAB

COURSE OBJECTIVES:

The students will be able:

1. To understand and explain scientifically the various chemistry related problems in the industry/engineering and develop experimental skills for building technical competence.
2. To familiarize with the practical implementation of fundamental concepts.
3. To gain hands on experience in handling the instruments.
4. To demonstrate the digital and instrumental methods of analysis.
5. To correlate the practical aspects with theoretical concepts.

List of ExperimentsTitrimetry:

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Ferrous ion by Dichrometry

Instrumental MethodsConductometry:

3. Estimation of concentration of HCl by Conductometric titrations.
4. Estimation of concentration of Acetic acid by Conductometric titrations.

Potentiometry:

5. Estimation of concentration of HCl by Potentiometric titrations.
6. Estimation of amount of Fe^{2+} by Potentiometric titration using $KMnO_4$.

Colorimetry:

7. Estimation of Copper by Colorimetric method.

Preparation

8. Preparation of a Polymer-**Bakelite**

Physical Property

9. Determination of Surface Tension of a given liquid by Stalagmometer.

Corrosion control method

10. Electroplating of Copper on an Iron object.

Text Book:

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

Suggested Readings:

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

COURSE OUTCOMES:

The students will be able:

1. To estimate the total hardness present in a sample of water.
2. To know the strength of an acid by conductometric and potentiometric methods.
3. To find the amount of Cu^{2+} present in unknown sample using colorimetric method.
4. To prepare a thermosetting polymer.
5. To determine the surface tension of a given liquid.
6. To understand the electroplating method for corrosion protection of metals.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

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(R22A0083) ENGINEERING AND COMPUTING HARDWARE WORKSHOP

It is consisting of 2 parts: Part I: Computing Hardware Workshop
Part II: Engineering Workshop

COURSE OBJECTIVES:

- Understand the internal structure of computer system and learn to diagnose minorproblems with the computer functioning.
- Know the proper usage and threats of the World Wide Web & Study in detail about thevarious features of Ms-Word, Excel, PowerPoint and Google Forms
- To obtain the knowledge about Electrical wiring and Soldering – Desoldering procedures.
- To provide hands on experience in usage of different engineering materials, toolsequipments and processes which are common in the engineering field.
- To develop professional attitude, team work, precision and safety practices at work place.

Part I: COMPUTING HARDWARE WORKSHOP

Task- 1: PC HARDWARE

Identification of the peripherals of a computer, components in a CPU and its functions.Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

Task- 2: TROUBLESHOOTING

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Task 3: INTERNET

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE

Task 4: MICROSOFT WORD

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art,

Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting) Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel

Task 6: MICROSOFT POWER POINT

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: GOOGLE FORMS

Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

PART II: ENGINEERING WORKSHOP

A. List of Experiments:

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lampwiring
3. Stair casewiring
4. Soldering and Desoldering practice – components, devices and circuits using general

1. Purpose PCB.

Note: Minimum ONE experiment need to be conducted in each trade

A. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry:

To prepare T-Lap Joint, Dovetail Joint.To prepare Mortise & Tenon Joint.

2. Fitting:

To prepare V-Fit, Dovetail Fit & Semi-circular fit.

3. Tin-Smithy:

To make Square Tin, Rectangular Tray & Conical Funnel.

Note: Minimum ONE experiment need to be conducted in each trade

Trades to demonstrate:

1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metal cutting (Water Plasma)

Note: Minimum a total of 3 trades to be demonstrated.

TEXT BOOKS – IT WORKSHOP

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. Excel Functions and Formulae, Bernd held, Theodor Richardson, Third Edition

TEXT BOOKS – ENGINEERING WORKSHOP

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech,2015
2. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill Education, 2005.

COURSE OUTCOMES:

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity to make effective usage of the internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes

The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

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I Year B. TECH - I- SEM **L/T/P/C**

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(R22A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

COURSE OBJECTIVES:

1. To work with an IDE to create, edit, compile, run and debug programs.
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C likeoperators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions,arrays etc.
5. To create, read from and write to text and binary files.

Practice sessions:

a. Write a simple program that prints the results of all the operators available in C (including pre/post increment, bitwise and/or/not, etc.). Read required operandvalues from standard input.

b. Write a simple program that converts one given data type to another using auto conversion andcasting. Take the values from standard input.

Simple numeric problems:

a. Write a program for finding the max and min from the three numbers.

b. Write the program for the simple, compound interest.

c. Write a program that declares Class awarded for a given percentage of marks, wheremark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% =Distinction.Read percentage from standard input.

d. Write a program that prints a multiplication table for a given number and the number of rows inthe table. For example, for a number 5 and rows = 3, the output should be:5 x 1 = 5
5 x 2 = 10
5 x 3 = 15

Expression Evaluation:

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).

b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %

and use Switch Statement).

c. Write a C program to find the factorial of a given number.

d. Write a C program to find the sum of individual digits of a positive integer and test given numberis palindrome.

e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Writea C program to generate the first n terms of the sequence.

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

g. Write a C program to find the roots of a Quadratic equation.

Arrays, Functions and Pointers:

a. Write a C program to find the minimum, maximum and average in an array of integers.

b. Write a C program that uses functions to perform the following:

1. Addition of Two Matrices
2. Multiplication of Two Matrices

c. Write a C program to find the Transpose of a matrix.

d. Write a function to swap the values of two variables using call by value.

e. Write a function to swap the values of two variables using call by reference.

f. Write C programs that use both recursive and non-recursive functions

1. To find the factorial of a given integer.
2. To find the GCD (greatest common divisor) of two given integers.

g. Write a program for reading elements using a pointer into an array and display the values usingthe array.

h. Write a program for display values reverse order from an array using a pointer.

i. Write a program through a pointer variable to sum of n elements from an array.

Strings:

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

1. To insert a sub-string into a given main string from a given position.
2. To delete n Characters from a given position in a given string.

b. Write a C program to determine if the given string is a palindrome or not (Spelled same in bothdirections with or without a meaning like madam, civic, noon, abcba,etc.)

c. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘tcontain ch.

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

Structures:

a. Write a C program to create a structure named book and display the contents of abook.

b. Write a C program to create a structure named student and display the details of 5 students using array of structures.

c. Write a C program to calculate total and percentage marks of a student using structure.

Files:

a. Write a C program to display the contents of a file to standard output device.

b. Write a C program which copies one file to another file.

c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.

d. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Miscellaneous:

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

b. Write a C program to construct a pyramid of numbers as follows:

```
1          *          1
1          * *        2 2

2
1          * * *      3 3 3

2

3
                      4 4 4 4
```

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI.
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill.
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

COURSE OUTCOMES:

After completion of the course, Students will be able to**:**

- formulate the algorithms for simple problems.
- identify and correct logical errors encountered during execution.
- represent and manipulate data with arrays, strings, structures and pointers.

- create, read and write to and from simple text and binary files.
- modularize the code with functions so that they can be reused.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - I- SEM **L/T/P/C**

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(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

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

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self-Explorjation - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and Prosperity A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

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

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body asan instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

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

UNIT - IV:

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

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

UNIT - V:

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

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

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
A. N. Tripathy, 2003, Human Values, New Age International Publishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.

7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
8. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers,Oxford University Press.
9. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including HumnaValues), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

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

COURSE OUTCOMES:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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(R22A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

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

COURSE OBJECTIVES:

1 To enrich students to express themselves appropriately and fluently in professionalcontexts.

2 To enhance their employability through regular participation in group discussions and interview skills.

3 To lay foundation with writing strategies for the future workplace needs.

4 To acquaint students with different components of professional presentation skills.

5 To equip students with necessary training in listening to comprehend dialects of Englishlanguage.

UNIT-I

"*Mokshagundam Visvesvaraya*"

Speaking - Description of Pictures, Places, Objects and Persons

Grammar - 'If' Clauses

Vocabulary - Homonyms, homophones and homographs

Writing - Paragraph Writing

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

UNIT –II

Speaking - SmallTalks

Grammar - Finite and Non-finite verbs

Vocabulary - Standard Abbreviations (Mini Project)

Writing - Job Application – Cover letter

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Unit –III

Speaking - Oral presentations
Grammar - Transformation of Sentences
Vocabulary - Idioms
Writing - Abstract Writing

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Unit – IV

'How a Chinese Billionaire Built Her Fortune'

Speaking - Telephonic Expressions and Conversations
Grammar - Auxiliary verbs & modelVerbs, Degrees of Comparison
Vocabulary - Word Analogy
Writing - Job Application - Resume

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Unit – V

Speaking - Group discussion
Grammar - Common Errors, Prepositions
Vocabulary - Technical Vocabulary
Writing - Report Writing

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. Skills Annexe & Epitome of Wisdom - B.Tech 1st Year English Study Material, JNTUH.
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
7. 'English for Engineers'. Cambridge University Press

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(R22A0024) MATHEMATICS-II

OBJECTIVES:

- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data,also used to find the roots of an equation and to solve differential equations.
- 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.
- 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.
- Evaluation of multiple integrals.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I: Interpolation

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

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

UNIT – II: Numerical Methods

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

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

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

UNIT III: Partial Differential Equations

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

Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar). Applications: Areas (by double integrals) and volumes (by double integrals and triple).

Unit V: Vector Calculus

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

Text Books:

a. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
b. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
c. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

Reference Books:

i) Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
ii) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

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

1. Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
2. Find the roots of algebraic, non algebraic equations.
3. Solve first order linear and non-linear partial differential equations.
4. Evaluate multiple integrals.
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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(R22A0201) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OBJECTIVES:

1. To understand the basic concepts of electrical circuits and analyze Circuits using Network Theorems.
2. To get overview of single phase A.C. circuits and three phase A.C. circuits.
3. To introduce the concept of DC Machines and Single-Phase Transformers.
4. To study the concepts of p-n diodes, rectifiers and Zener diodes.
5. To study the concepts of BJTs, JFET and MOSFETs.

UNIT –I: **INTRODUCTION TO ELECTRICAL CIRCUITS**: Concept of Circuit and Network, R-L-CParameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.

NETWORK ANALYSIS (D.C EXCITATION): Series and parallel connections of Resistive Networks,voltage division and current division, Meshanalysis, Nodal analysis

NETWORK THEOREMS: Thevenin's Theorem, Norton's Theorem and Superposition Theorem(for independent sources).

UNIT–II: SINGLE PHASE A.C. CIRCUITS: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form.Concept of phase, phasor representation of sinusoidal quantities phasedifference, Sinusoidal response of pure R, L, C.

THREE PHASE A.C. CIRCUITS: Advantages of Three phase over single phase, Voltage and Currentrelationship in star and delta connections.

UNIT-III:MACHINES:

DC Generator: principle of operation and working, Action of commutator, constructionalfeatures, basic concept of Lap and wave windings, emf equation.

DC Motor: principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.

Single Phase Transformer: principle of operation, emf equation, problems on emf equation.

UNIT–IV:

P-N JUNCTION DIODE: P-N junction diode, symbol and forward biased and reverse biased conditions, V-I characteristics of P-N junction diode, Half wave, Full wave and Bridge rectifiers.

ZENER DIODE: Symbol, construction, principle of operation and its applications.

UNIT–V:

BIPOLAR JUNCTION TRANSISTOR: Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors,Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

JFET, Symbol, Construction, Principle of operation, and its Characterstics, MOSFET (Enhancement and Depletion mode) Symbol, Construction, Principle of Operation and its Characteristics.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc GrawHill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.
4. "ElectronicDevices&Circuits", SpecialEdition–MRCET,McGrawHillPublications,2017.
5. IntegratedElectronicsAnalogDigitalCircuits,JacobMillmanandD.Halkias,McGrawHill.
6. ElectronicDevicesandCircuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

REFERENCE BOOKS

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.
5. Electronic Devices and Circuits, K.LalKishore, B.S Publications
6. Electronic Devices and Circuits, G.S.N.Raju, I.K.International Publications, NewDelhi,2006.

COURSE OUTCOMES:

After the course completion the students will be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n diode, rectifiers and Zener diode
6. To understand the concepts of BJTs, JFET and MOSFETs

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(R22A0301) COMPUTER AIDED ENGINEERING GRAPHICS COURSE

OBJECTIVES: To learn basic engineering graphics and Auto CAD concepts.

1 To learn the 2D principles of orthographic projections and Multiple views of thesame
2 To know the planes and solid Projection
3 To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
4 To know the conversion of Orthographic Views to isometric Views and isometric to Orthographic views

UNIT 1

Introduction to Auto CAD: Introduction to software interface Standard toolbar/menu, Understanding the co-ordinate systems-2D and 3D Visualisation, Setting the Paper sizes and title block importance, printing and plotting. **Draw commands:** line, arc, circle, rectangle, polygons, ellipse, polyline, splines, text. **Modify commands:** copy, mirror, offset, arrays, move, extend, break, trim, lengthen, chamfer, fillet.etc., **Constraints:** horizontal, vertical, parallel, concentric, perpendicular, symmetric, equal, collinear. **Dimensioning Commands:** Dimensioning and Dimension Style. **Division:** Line division, and circle division. **Polygons:** Constructing regular polygons - inscribed and circumscribed methods and general method.

UNIT 2

Projection of Points: Introduction to reference planes, four quadrants, importance of reference lines. Projection of points in all the four quadrants

Projection of Lines: Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes

UNIT 3

Projections of Planes: Introduction to Regular planes. Parallel/Perpendicular to one reference plane, Inclined to one plane and Inclined to both the reference planes.

Projections of Solids: Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

UNIT 4

Isometric Projection: Introduction, Isometric projection of simple plane figures, Solids - right regular prisms, pyramids, cylinder, cone – H.P, V.P

UNIT 5

Conversions: Conversion of Isometric Views to Orthographic Views and Orthographic Views to Isometric Views

TEXT BOOKS:

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Prem Kumar Fifth edition, New Age International Publishers

REFERENCE BOOKS:

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers, Bangalore.

COURSE OUTCOMES:

After the completion of course the student will be capable to

2. To produce geometric construction, dimensioning & Curves and detail drawings.
3. To compile Projections of points, lines, then create virtual drawing by using computer
4. To sketch the Planes and Solid Projections
5. To develop isometric drawings of simple objects reading the orthographic projections ofthose objects.
6. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - II- SEM **L/T/P/C**

3/-/-/3

(R22A0502) PROBLEM SOLVING USING PYTHON PROGRAMMING

COURSE OBJECTIVES:

This course will enable students

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To develop Python programs with using arrays and functions.
4. To use Python data structures–-lists, tuples, dictionaries.
5. To do input/output with files in Python.

UNIT-I

Introduction to Python Programming Language: Introduction to Python Language, Features of Python, Python Installation, Python Input and Output Statements, Numeric Data Types: int, float, boolean, complex and string and its operations, Standard Data Types: List, Tuples, Sets and Dictionaries, Data Type conversions, Comments in Python.

UNIT-II

Variables and Operators: Understanding Python variables, multiple variable declarations, Operators in Python: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

Control Flow and Loops: Indentation, if statement, if-else statement, chained conditional if- elif - else statement, Loops: While loop, for loop using ranges, Loop manipulation using break, continue and pass.

UNIT- III

Arrays: Advantages of Arrays, Creating an Array, Importing the Array Module, Indexing and Slicing on Arrays, Types of arrays, working with arrays using numpy.

UNIT-IV

Functions: Defining a function, Calling Functions, Passing parameters and arguments, Python Function arguments: Positional Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function–Local and Global Variables, Fruitful Functions, Anonymous functions or Lambda functions, Powerful Lambda functions in Python.

UNIT-V

File Handling in Python: Introduction to files, Text files and Binary files, Access Modes, Writing Data to a File, Reading Data from a File, File input / output functions.

Error Handling in Python: Introduction to Errors and Exceptions: Compile-Time Errors, Logical Errors, Runtime Errors, Types of Exceptions, Python Exception Handling Using try, except and finally statements.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into arrays and functions.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python programs.

TEXT BOOKS

1. R.NageswaraRao,"Core Python Programming",dream tech.
2. Allen B. Downey,``Think Python: How to Think Like a Computer Scientist" 2nd edition,Updated for Python3, Shroff/O'Reilly Publishers,2016.
3. Python Programming: A Modern Approach,Vamsi Kurama,Pearson.

REFERENCEBOOKS:

1. Core Python Programming,W.Chun,Pearson.
2. Introduction to Python,Kenneth A. Lambert, Cengage.
3. Learning Python,Mark Lutz,Orielly.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II- SEM **L/T/P/C**

-/-/2/1

(R22A0081) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

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

OBJECTIVES:

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize 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, ample speaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language and Communication Skills Labs 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 and Communication Skills Lab

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants- Transcriptions
ICS Lab: Ice-Breaking activity - JAM session

UNIT –II

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers
ICS Lab: Situational Dialogues/Role Plays-–Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

UNIT–III

CALL Lab: Syllable and Syllabification
ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

UNIT –IV

CALL Lab: Word Stress and Intonation
ICS Lab:Information transfer – from visual to verbal - maps, charts, tables and graphs

UNIT –V

CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI) ICS Lab: Making a Short Speech - Extempore

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component):

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

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

2. Interactive Communication Skills (ICS) Lab :

A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

DISTRIBUTION AND WEIGHTAGE OF MARKS

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 30 marks and 70 year-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

OUTCOMES:

1. Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.

2. Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.

3. Accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.

4. Imbibing appropriate use of language in situations to work as an individual and as o leader in diverse teams

5. Equip themselves with the pre-requisites, and relevant techniques to effectively attend corporate interviews

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - II- SEM **L/T/P/C**

-/-/3/1.5

(R22A0281) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

1. To design an electrical system.
2. To analyze a given network by applying various circuit laws and network theorems.
3. To expose the students to the operation of DC machine and transformer.
4. To exhibit the students to the operation of PN junction diode and Zener diode.
5. To expose the students to the operation of Rectifier.

Among the following experiments any 10 are to be conducted

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Magnetization characteristics of DC shunt generator.
6. Speed control of DC shunt motor using armature control method.
7. Speed control of DC shunt motor using flux control method
8. Load test on single phase transformer.
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Half wave rectifier.
12. Full wave rectifier.

COURSE OUTCOMES:

At the end of the course, students would be able to

2. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
3. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.
4. Perform the required tests on transformers and DC motors.
5. Plot the characteristics of Zener diodes.
6. Determine the working of rectifiers in detail.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - II- SEM **L/T/P/C**

-/-/3/1.5

(R22A0582) PROBLEM SOLVING USING PYTHON PROGRAMMING LAB

COURSE OBJECTIVES

This course will enable the students:

1. Able to understand Syntax and Semantics and create Arrays and Functions in Python.
2. Able to learn different data types Lists, Dictionaries in Python.
3. Able to know how to execute the programs using loops and control statements.
4. Able to learn decision making and Functions in Python.
5. Able to know how to handle Files and exceptions in Python.

Week 1:

A) Write python program to print HelloWorld.

B) Write a python program to get string,int,float input from user.

C) Write a python program to add 2 numbers.

Week 2:

A) Create a list and perform the following methods

1) insert() 2)remove() 3)append() 4)len() 5)pop() 6) clear()

B) Write a python program to find the length of list.

C) Write a python program to find the smallest and largest number in the list.

Week 3:

A) Create a tuple and perform the following methods

1) Add items 2) len() 3)check for item in tuple 4)Access iems

B) Write a python program using the following methods:1)count2)index

C) Write a python program using “+” and “*” operations which resulting a new tuple.

Week 4:

A) Create a dictionary and apply the following methods

1) Print the dictionary items 2)access items 3)use get() 4)change values 5)use len()

B) Write a python code to convert list of tuples into dictionaries.

C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

Week 5:

A) Write a python program to perform arithmetic, assignment, logical and comparisonoperators.

B) Write a Python program to add two positive integers without using the '+' operator. (use bitwise operator)

C) Write a Python program to perform the basic four operators(+,-,*,/).

Week 6:

A) Write a simple python program to declare a variable in different possible ways.

B) Write a python program to show precedence of operators using the expression:z=(v+w)*x/y

C) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation.

Week 7:

A) Write a python program to print a number is positive/negative using if-else.

B) Write a python program to find largest number among three numbers.

C) Write a python Program to read a number and display corresponding day using if-elif-else.

D) Write a python program to print list of numbers using range and for loop.

Week 8:

A) Write a python code to print the sum of natural numbers using while loop.

B) Write a python program to print the factorial of given number.

C) Write a python program to find the sum of all numbers stored in a list using for loop.

Week 9:

A) Using a numpy module create an array and check the following:

1. Type of array 2. Axes of array 3. Shape of array 4. Type of elements in array

B) Using a numpy module create array and check the following:

1. List with type float 2. 3*4 array with all zeros 3. From tuple 4. Random values

Week10:

A) Write python program in which a function is defined and calling that function printsHello World.

B) Write python program in which a function (with single string parameter) is defined and calling that function prints the string parameters given to function.

C) Write a python program using with any one of python function argument.

Week11:

A) Write a program to double a given number and add two numbers using lambda().

B) Write a program for filter() to filter only even numbers from a given list.

C) Write a program for map() function to double all the items in the list?

D) Write a program to find sum of the numbers for the elements of the list by usingreduce().

Week12:

A) Write a python program to open and write “hello world” into a file.

B) Write a python program to write the content “hi python programming” for the existingfile.

C) Write a python program to read the content of a file.

Week 13:

A) Write a python program to append data to an existing file and then displaying the entire file.

B) Write a python program to open a new file, add some data into it and display the contents ofthat file.

Week 14:

A) Write a python program to handle the Zero Divison Error exception.

B) Write a python program to demonstrate multiple except block with a single try block.

TEXT BOOKS:

1. R.NageswaraRao,"Core Python Programming",dream tech.
2. Allen B. Downey,"Think Python: How to Think Like a Computer Scientist",Second Edition,Updated for Python3,Shroff /O' Reilly Publishers,2016.

COURSE OUTCOMES:

After completion of the course, Students will be able to**:**

1. Evaluate Problem solving and programming capability.
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
3. Implement conditional and loop for python programs.
4. Express different Decision Making statements, Arrays and Functions.
5. Understand and summarize different File handling operations and exceptions.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II- SEM **L/T/P/C**

2/-/-/-

(R22A0004) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES: On successful completion of this course, students will be able:

1. CO1: To distinguish the inter relationship between living organism and environment.
2. CO2: To categorize various types of natural resources available on the earth surface.
3. CO3: To detect the causes, and control measures of various types of environmentalpollution.
4. CO4: To articulate the issues related to solid waste and its management.
5. CO5: To explain and understand the importance of Sustainable development.

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

1. CO1: Differentiate between various biotic and abiotic components of ecosystem.
2. CO2: Describe the various types of natural resources.
3. CO3: Examine the problems associated with waste management.
4. CO4: Evaluate the causes, and apply control measures of various types of environmental pollutions.
5. CO5: Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

UNIT-I ECOSYSTEMS (6 hours)

Definition, Scope and Importance of Ecosystem; Structure of an Ecosystem - abiotic and biotic component; Functions of an ecosystem- food chains, food webs and ecological pyramids.

Activities: **Activities**: Case studies, poster making, Essays on biotic components.

UNIT-II NATURAL RESOURCES (6hours)

Classification of Resources: Definition of natural resource - renewable and non -renewable resources. Forest resources - functions and uses of forests, Deforestation - causes and consequences. Water resources – Dams - benefits and environmental problems over dams. Renewable resources - solar energy (solar cells), hydro power, biogas and bio-fuel.

Activities: Case studies, seminars, Group Project works, to prepare rain water harvesting models, to demonstrate the generation of electricity with the utilization of non-conventional energy resources.

UNIT-III ENVIRONMENTAL POLLUTION AND TECHNIQUES (6 hours)

Definition, Types of pollution- Air pollution- causes, effects, control measures of air pollution and prevention techniques. Water pollution- causes, effects, control measures and techniques.

Activities: Work sheets, Debate, seminars, surrounding case studies.

UNIT-IV SOLID WASTE MANAGEMENT (5 hours)

Definition of Solid waste, characteristics of solid waste; Solid waste management- collection, transportation, processing treatment and disposal methods; e-waste management; 3R techniques- reduce, reuse and recycle.

Activities: Quiz, Puzzles, Seminars, Case studies.

UNIT-V SUSTAINABLE DEVELOPMENT (4 hours)

Definition of sustainable development, sustainable development goals, threats to sustainability, strategies to achieve sustainable development.

Activities: Worksheets, seminars, slogans, group projects.

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015

REFERENCE BOOKS

1. Environmental Studies by Anubha Kaushik, 4 Edition, New age international publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHLLearning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA editio

II-I

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH-II-YEAR-I-SEM **L/T/P/C**
3/1/-/4

(R22A0025) Numerical Methods and Complex Variables
(Common to ECE & EEE)

Objectives: Tolearn

- Numerical methods for solving ordinary differential equations.
- The properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem.
- Differentiation and integration of complex valued functions. Evaluation of integrals using Cauchy's integral formula.
- Taylor's series, and Laurent's series expansions of complex functions, evaluation of integrals using residue theorem.
- Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification, rotation, reflection, inversion, and Properties of bilinear transformations.

UNIT– I:
Numerical Methods

Definition of Interpolation, Finding root by Iterative method, Solving first order ODE by Picards method, Taylors series method for solving second order ODE, Runge-Kutta method for solving second order ODE and Numerical Differentiation.

UNIT-II:
Laplace Transforms

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

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

UNIT–III:
Analytic functions

Complex functions andits representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration –Cauchy's integral theorem (singly and multiply connected regions)–Cauchy's integral formula–Generalized integral formula.

UNIT–IV:

Singularities and Residues

Radius of convergence– Expansion in Taylor's series, 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 Mappings

Conformal mapping: Transformation of z-plane tow-plane by a function, conformal transformation. Standard transformations- Translation; Magnification and rotation; inversion and reflection, Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

i) Higher Engineering Mathematics by B.S.Grewal, KhannaPublishers.
ii) Higher Engineering Mathematics by Ramana B.V,Tata Mc Graw Hill.
iii) Complex Variables: Theory and Applications by H.S Kasana.

REFERENCES:

i) Complex Variables by Murray Spiegel, Seymour Lipschutz, etal. By Schaum's out lines series.
ii) Advanced Engineering Mathematics by Kreyszig, John Wiley &Sons.
iii) Advanced Engineering Mathematics by Michael Greenberg–Pearson publishers.

Course Outcomes: After going through this course the students will be able to

1. Understand the Numerical differentiation and able to solve the second order ODE by Numerical methods.
2. Solve differential equations with initial conditions using Laplace Transformation.
3. Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
4. Find the Taylor's and Laurent series expansion of complex functions and solution of improper integrals can be obtained by Cauchy's-Residue theorem.
5. Understand the conformal transformations of complex functions can be dealt with Ease.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR B.Tech EEE–ISEM **L/T/P/C**

3/1/0/4

(R22A0202) ELECTRICAL MACHINES - I

Course Objectives:

- To study and understand construction, operation and applications of DC generators
- To study and understand construction, operation and applications of DC Motors
- To study and understand the performance of DC machines by various testing methods
- To study and understand construction, operation of single phase transformers
- To study and understand the performance of single phase transformers by various testing methods and poly phase transformers

UNIT - I:

D.C. GENERATORS:

Principle of operation – constructional features – armature windings – lap and wave windings—E.M.F Equation, Numerical Problems. Armature reaction - Cross magnetizing and De-magnetizing AT/pole – compensating winding – interpoles. –. Types of d c generators – separately excited and self-excited generators – build-up of E.M.F in self excited generator - causes for failure to self-excite and remedial measures- critical field resistance and critical speed, Characteristics and applications of shunt, series and compound generators.

UNIT - II:

D.C MOTORS:

Principle of operation – Significance of Back E.M.F. –Torque equation, Numerical Problems. Types of d c motors, Characteristics and Applications of shunt, series and compound motors. Speed control of D.C. Shunt Motors - Armature control and field or flux control methods. DC Motor starters - 3 point starters.

UNIT - III:

TESTING OF D.C. MACHINES:

Losses - Constant & Variable losses – Efficiency – condition for maximum efficiency, Numerical Problems. Methods of Testing: Direct Test (Brake test), Indirect Test (Swinburne's test) and Regenerative test (Hopkinson's test) - Field's test.

UNIT-IV

SINGLE PHASE TRANSFORMERS:

Principle of operation- constructional features- Types step-up and step down- EMF equation- Numeric problems- operation on no load and on load with phasor diagram- Equivalent circuit- condition for maximum efficiency- losses and efficiency- regulation - All day efficiency- Numerical Problems. Applications.

UNIT - V:

TESTING OF TRANSFORMERS AND POLY-PHASE TRANSFORMERS:

Predetermination of efficiency and regulation by Open Circuit and Short Circuit tests - Sumpner's test – parallel operation with equal and unequal voltage ratios. - Auto transformers: Working principle and equivalent circuit.

Poly-phase transformers: Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ, -Scott connection and Application.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011
2. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Abhijith Chakrabarthi & Subitha Debnath, "Electrical Machines", Mc Graw Hill, 2015
2. A. E. Fitzgerald and C.Kingsley, "Electric Machinery", NewYork, McGraw Hill Education,
2013

Course Outcomes: At the end of this course, students will be able to

- Discuss the construction and operation of DC machine
- Discuss the operation, starting and speed control of DC Motor
- Use different tests to calculate the efficiency of DC machines
- Explain the construction and operation of single phase transformers
- Calculate the efficiency and regulation of single phase transformers

MALLAREDDYCOLLEGEOFENGINEERINGANDTECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR B.Tech EEE–I SEM **L/T/P/C**
3/0/0/3

(R22A0204)ELECTRICAL CIRCUITS ANALYSIS

COURSEOBJECTIVES:

1. To understand and analyze the DC Circuits
2. To evaluate network parameters of given electrical network.
3. To understand the concept of DC and AC Transients.
4. Tolearnthevariousconnectionsof3-phasecircuits and coupled circuits.
5. To study the locus diagrams of series and parallel combination of R-L-C –circuits and Concept of the concept of resonance.

UNIT-I

INTRODUCTION TO ELECTRICAL CIRCUITS:

Classification of Network Elements, Types of Sources, Source Transformation, Circuit Reduction Technique-Series and Parallel connection(R, L, C), Star-Delta and Delta –Star Transformation.

NETWORK THEOREMS:

Reciprocity Theorem, Maximum Power Transfer Theorem, Milliman's Theorem(DC SUPLLY ONLY)

UNIT-II

NETWORKPARAMETERS:

Two port network parameters–Z, Y, ABCD and hybrid parameters. Condition for reciprocity and symmetry. Conversion of Z and Y parameters, Interconnection of Two port networks in series, parallel and cascaded configuration.(ALL PROBLEMS IN RESITANCE VALUES ONLY)

UNIT–III

TRANSIENT ANALYSIS:

Initial conditions, Transient response of R-L and R-C circuits for D.C. and A.C. excitations - Solution using differential equation method.

UNIT–IV:

THREE PHASE CIRCUITS:

Analysis of balanced and unbalanced 3-phase circuits, Star and delta connections, Measurement of three-phase power for balanced loads (single wattmeter method & two wattmeter method).

Coupled circuits: Concept of self and mutual inductance, Dot convention, Coefficient of coupling,

Analysis of circuits with mutual inductance

UNIT – V:

LOCUS DIAGRAMS & RESONANCE:

Series and Parallel combination of R-L and R-C circuits with variation of various parameters.Resonance for series and parallel circuits, concept of band width and Q factor.

TEXTBOOKS:

1.WilliamHartHayt,JackEllsworthKemmerly,StevenM.Durbin(2007),Engineering CircuitAnalysis,7thedition,McGraw-HillHigherEducation,New Delhi,India
2.Josepha.Edminister(2002),Schaum'soutlineofElectricalCircuits,4th edition, Tata Mc Graw Hill Publications, New Delhi,India.
3.A.Sudhakar, ShyammohanS.Palli(2003), ElectricalCircuits, 2ndEdition, TataMcGrawHil l,NewDelhi

REFERENCEBOOKS:

1. L.Wadhwa(2008), Electric Circuits Analysis, 2ndedition,NewAgeInternationalPublications,New Delhi.
2. A.Chakrabarty(2010),CircuitTheory,5thedition,DhanpatRai&SonsPublications,New Delhi.
3.VanValkenburg,M.E.(1974),NetworkAnalysis,3rdEdition,PrenticeHallofIndia ,NewDelhi.
4.ATextBookonElectricalTechnology. –BLTHERAJA,Vol1,S.ChandPublications.

COURSEOUTCOMES:

At the end of this course the students would be able to:

1. Analyze electric circuits using network theorems.
2. Understand and evaluate the different types of two portent work parameters.
3. Analyze the transient and steady-state response of electrical circuits.
4. Able to understand the concept of balanced and unbalanced loads in three phase circuits and coupled circuits.
5. Analyze the behavior of series and parallel R-L-C circuits at resonance basic concept of Locus diagrams of R-L,R-C series and parallel circuits.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

3/0/0/3

(R22A0205) POWERSYSTEM-I

Prerequisite: Electrical Circuit Analysis.

Course Objectives:

- To understand the power generation through conventional and non-conventional sources.
- To illustrate the economic aspects of power generation and tariff methods.
- To calculate overhead transmission line inductances and capacitances.
- To study the performance of transmission lines
- To know about DC distribution systems

UNIT-I

GENERATION OF ELECTRIC POWER:

Conventional Sources Energy Sources: Layout and major components of Hydro station, Steam Power Plant, Nuclear Power Plant (Qualitative treatment only). Non-Conventional Energy Sources: Principles of Solar, Wind and Geothermal Power Generations (Elementary treatment only).

UNIT – II

ECONOMIC ASPECTS OF POWER GENERATION:

Definitions of Connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants. Tariff Methods: Costs of Electrical Energy-Fixed, Semi-fixed and Running Cost. Types of Tariff: Simple, Flat Rate, Block-Rate, two-part, three –part, power factor tariff methods and Numerical Problems.

UNIT – III

OVER HEAD TRANSMISSION LINES:

Line conductors, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductor transposition, bundled conductors, and skin and proximity effects.

UNIT - IV:

PERFORMANCE OF TRANSMISSION LINES:

Representation of lines, short transmission lines, medium length lines, nominal T and PI-representations, long transmission lines and Ferranti Effect.

CORONA: Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss and methods of reducing corona loss, Disadvantages of corona.

UNIT-V:

DC DISTRIBUTION:

Classification of Distribution Systems. - Comparison of DC vs.AC and Under Ground vs. Over- Head Distribution Systems. Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

TEXT BOOKS:

1. C.L. Wadhwa, “Generation, Distribution and Utilization of Electrical Energy”, 2 n d Edition, New AgeInternational, 2009.

2. V.K Mehta andRohit Mehta, “Principles of Power Systems”, S. Chand & Company Ltd, New
Delhi, 2004.

REFERENCE BOOKS:

1. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, “A Text book on Power System Engineering”, Dhanpat Rai Publishing Company (P) Ltd, 2008.
2. C.L. Wadhwa, “Electrical Power Systems”, 5 th Edition, New Age International, 2009.
3. M.V. Deshpande, “Elements of Electrical Power Station Design”, 3 rd. Edition, Wheeler Pub. 1998.
4. H.Cotton & H. Barber, “The Transmission and Distribution of Electrical Energy”, 3 rd. Edition, 1970.
5.W.D.Stevenson, “Elements of Power System Analysis”, 4 th Edition, McGraw Hill, 1984.

Course Outcomes:

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

- Understand the operation of conventional and renewable electrical power generating stations.
- Evaluate the power tariff methods and Economics associated with power generation.
- Analyze transmission line inductance and capacitance.
- Analyze transmission line performance.
- Analyze the operations of Distribution systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/0/0/3

(R22A0207) ELECTRO MAGNETIC FIELDS

COURSE OBJECTIVES:-

1. To introduce the concepts of electric field, magnetic field.
2. To Analyze Maxwell's equation in different forms in Electrostatic, Magnetic time varying fields.
3. To solve the problems in different EM fields.
4. To analyze moving charges in Magnetic fields.
5. To understand electric and magnetic fields in the development of theory for electrical machines.

UNIT – I
ELECTROSTATICS:
Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Potential gradient – Gauss's law– Application of Gauss's Law – Maxwell's first law, div (D)=ρv – Laplace's and Poison's equations.

UNIT – II
DIELECTRICS & CAPACITANCE: Behavior of conductors in an electric field – Conductors and Insulators – Dielectric boundary conditions – Capacitance – Capacitance of parallel plates– spherical co-axial capacitors— Current density – conduction and Convection current densities - Ohm's law in point form – Equation of continuity

UNIT – III
MAGNETO STATICS:
Static magnetic fields – Boit-Savart's law – Magnetic field intensity (MFI)– MFI due to a straight current carrying filament – MFI due to circular, current Carrying wire – Relation between magnetic flux and magnetic flux density –Maxwell's second Equation, div(B)=0,Ampere's circuital law and its applications – Point form of Ampere's circuital law -Maxwell's third equation, Curl (H)=Jc

UNIT – IV
FORCE IN MAGNETIC FIELDS:
Magnetic force Moving charges in magnetic field – Lorentz force equation – Self and Mutual inductance – determination of self-inductance of a solenoid and torrid – energy stored and density in a magnetic field.

UNIT – V
TIME VARYING FIELDS:
Time varying fields – Faraday's laws of electromagnetic induction –
Its integral and point forms – Maxwell's fourth equation, Curl (E)=-dB/dt – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current.

TEXT BOOKS:

1. "William H.Hayt& John. A. Buck","Engineering Electromagnetic" ,Mc.Graw-HillCompanies, 7thEdition,2009.

2."Sadiku", "Electromagnetic Fields", Oxford Publications, 4th Edition,2009.

REFERENCE BOOKS:

1. "CR Pauland S.A.Nasar", "Introduction to Electromagnetic", Mc GrawHill Publications, 3rd Edition, 1997.
2. "Nathan Ida", "Engineering Electromagnetic", Springer (India) Pvt. Ltd. 2 nd Edition, 2015.
3. "DJ Griffiths", "Introduction to Electro Dynamics", Prentice-HallofIndia Pvt.Ltd, 3rdedition, 1999.
4. "J.DKraus", "Electromagnetic" ,McGraw-HillInc. 4th edition, 1992.

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. To understand the basic laws of electro magnetism.
2. To obtain the electric and magnetic fields for simple configurations under static conditions.
3. To analyze time varying electric and magnetic fields.
4. To understand Maxwell's equation in different forms and different media.
5. To understand the Faraday's law of Electromagnetic induction.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
0/0/2/1

(R22A0282) Electrical Machines Laboratory-I

Course Objectives:

- To conduct various tests on different D C Generators
- To conduct various tests on different D C Motors
- To perform different tests on Single and Three Phase Transformers

The following experiments are required to be conducted **compulsory** experiments:

Magnetization characteristics of DC shunt generator (Determination of critical field resistance and critical speed)
Load test on DC shunt generator (Determination of characteristics)
Load test on DC series generator (Determination of characteristics)
Hopkinson's test on two identical DC shunt machines (Predetermination ofefficiency)

Swinburne's test on DC Machine (Predetermination of efficiencies)
Speed control of DC shunt motor using Armature control and Field control Methods
Brake test on DC shunt motor (Determination of performance curves)
OC and SC Tests on Single Phase Transformer

In addition to the above eight experiments, **at least any two** of the experiments from the following list are required to be conducted:

1. Load test on DC compound generator (Determination ofcharacteristics)
2. Field's test on two identical DC series machines (Determination ofefficiency)
3. Brake test on DC compound motor (determination of efficiency)
4. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
5. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. PrithwirajPurkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Determine the characteristics of different d c generators using differ testing methods.
- Determine the performance of different d c motors using different te methods.
- Calculate Efficiency and Regulation of different Transformers using different testing methods

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

0/0/2/1

(R22A0284) ELECTRICAL CIRCUITS ANALYSIS LAB

COURSE OBJECTIVES:

1. To learn the various connections of 3-phasecircuits.
2. To understand the concept of resonance and Locus Diagrams of RL and RC SeriesCircuit
3. To study the Z and Y Parameters of two Port networks.
4. To study and understand the Transmission (ABCD) and Hybrid parameters of Given electrical network.

The following experiments are required to be conducted as compulsory

1) Millman's Theorem
2) Maximum power transformation Theorem
3) Series and Parallel Resonance
4) Determination of Two port network parameters - Z and Y Parameters
5) Determination of Two port network parameters -Transmission (ABCD) parameters.
6) Measurement of Active Power for Star and Delta connected balanced loads
7) Measurement of Reactive Power for Star and Delta connected balanced loads
8) Reciprocity Theorem

In addition to the above eight experiments, at least any two of the experiments from thefollowing list are required to be conducted

1. Determination of Two port network parameters -Hybrid parameters.
2. Locus Diagrams of RL(R-varying) and RC(R-varying) Series Circuits
3. Determination of Co-efficient of Coupling and Separation of Self and Mutualinductance in a Coupled Circuits
4. Determination of Time response of first order RL & RC circuit for periodic sinusoidal inputs – Time Constant and Steady state error.

TEXTBOOKS:

1. William HartHayt, Jack Ellsworth Kemmerly, Steven M. Durbin(2007),Engineering CircuitAnalysis,7thedition,McGraw-HillHigherEducation,New Delhi, India
2. Josepha.Edminister(2002),Schaum'sout line of Electrical Circuits,4th edition, Tata Mc Graw Hill Publications, New Delhi, India.
3. A.Sudhakar,ShyammohanS.Palli(2003),ElectricalCircuits,2ndEdition,TataMcGr awHill,NewDelhi

REFERENCEBOOKS:

1. L.Wadhwa(2008),Electric Circuits Analysis,2ndedition, New Age International Publications, New Delhi.
2. A.Chakrabarty(2010),CircuitTheory,5thedition,DhanpatRai & Sons Publications, NewDelhi.
3. VanValkenburg,M.E.(1974),NetworkAnalysis,3rdEdition,PrenticeHall ofIndia, New Delhi.
4. A Text Book on Electrical Technology. – BL THERAJA, Vol1, S. Chand Publications.

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. Analyze a given network by applying millman's Theorem.
2. Explain the basics of Series and Parallel Resonance.
3. To study the Transmission (ABCD) and Hybrid parameters of two port networks.
4. Explain clearly the calculations of three phase Active and Reactive powerfor Star and Delta connected balanced load.
5. Apply concepts of electrical circuits across engineering.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

0/0/2/

(R22A0285) ELECTRICAL SIMULATION TOOLS LABORATORY

Course Objectives:

- To understand basic block sets of different simulation platform used inelectrical/electronic circuit design.
- To understand use and coding in different software tools used in electrical/
electronic circuit design.
- To understand the simulation of electric machines/circuits for performanceanalysis.

- **Any** ten experiments **need to be performed from the following experiments from varioussubject domains**
  - Introduction to basic matrix operations.
  - Generation of standard test signals using suitable simulation tools.
  - Measurement of Voltage, Current and Power in DC circuits.
  - Verification of different network theorems Thevenin's & Norton's with independent
  - sources using suitable simulation tools.
  - Verification of performance characteristics of basic Electronic Devices using suitable
  - simulation tools.
  - Analysis of series and parallel resonance circuits using suitable simulation tools
  - Obtain the response of R-L circuit with standard test signals using suitable simulation
  - tools.
  - Modeling and Analysis of Low pass and High pass Filters using suitable simulation
  - tools
  - Performance analysis of DC motor using suitable simulation tools
  - Modeling of transformer using suitable simulation tools.

  - Analysis of single-phase bridge rectifier with and without filter using suitable
  - Simulation tools.
  - Modeling and Verification of Voltage Regulator using suitable simulation tools.
  - Modeling of transmission line using simulation tools.

  - Performance analysis of Solar PV model using suitable simulation tools

TEXT BOOKS:

1. M. H. Rashid, Simulation of Electric and Electronic circuits using PSPICE – by M/s PHI
Publications.
2. Agam Kumar Tyagi, "MATLAB and SIMULINK for Engineers" OUP Publisher, 2012.
3. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education,1997.
4. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education,
2004.

REFERENCE BOOKS:

1. Reference guides of related software's
2. Rashid, Spice for power electronics
and electric power, CRC Press

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Develop knowledge of software packages to model and program electrical andelectronics systems.
- Model different electrical and electronic systems and analyze the results.
- Articulate importance of software packages used for simulation in laboratoryexperimentation by analyzing the simulation results.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. EEE- I Sem **L/T/P/C**

0/0/2/0

(R22A0005) FOREIGN LANGUAGE-FRENCH

INTRODUCTION

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

COURSE OBJECTIVES

1. To inculcate the basic knowledge of the French language
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELF A1
5. To develop in the student an interest towards learning languages.

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet - Introducing people
Writing: Understand and fill out a form
Grammar: The verbs “to be ' and “to have " in the present tense of the indicative
Vocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation
Writing: Write and understand a short message
Grammar: Nouns (gender and number) - Articles - The–erverbs in the present-Possessive adjectives - Qualifying adjectives
Vocabulary: The family – Clothes-Colors- The numbers from 1 to 100-The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency
Writing: A letter to a friend
Grammar: The expression of time– The –ir verbs in the present- The verbs do, go, take, come,- Adverbs-Reflexive verbs
Vocabulary: The days and months of the year- The sports-Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops
Writing: A dialogue between a vendor and a customer at the market
Grammar: Verbs “to want”, “to can”- Express capacity / possibility- Express will / desire – the future tense

Vocabulary: The food – Meals-Fruits and vegetables– The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives- Prepositions- The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays-The city– Furniture

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

REFERENCE BOOKS

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

COURSE OUTCOMES

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

II- II

MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

II Year B. TECH - II- SEM **L/T/P/C**

3 /0/0/3

(R22A0353) SOLID MECHANICS AND HYDRAULIC MACHINES

Course Objectives:

- To identify an appropriate structural system and work comfortably with basic engineering mechanics.
- To Understand the meaning of centers of gravity, centroids, moments of Inertia and rigid body dynamics.
- Study and develop basic understanding of important mechanisms, drives and materials used in the engineering and consumer industry in conjunction with other electrical
- To Study the characteristics of hydroelectric power plant and Design of hydraulic machinery
- To understand the working principle of different types turbines, pumps and motors that work on the principle of hydraulic

UNIT–I:

INTRODUCTION OF ENGINEERING MECHANICS:

Basic concepts of System of Forces-Coplanar Forces–Components in Space–Resultant- Moment of Forces and its Application – Couples and Resultant of Force System-Equilibrium of System of Forces-Free body diagrams- Support reactions different beams for different types of loading – concentrated & uniformly distributed.

UNIT–II:

CENTROID AND CENTER OF GRAVITY:

Centroids – Theorem of Pappus- Centre of Gravity of Bodies – Area moment of Inertia: –polar Moment of Inertia.

SIMPLE STRESSES AND STRAINS ANALYSIS:

Concept of stress and strain- St. Venant's Principle-Stress and Strain Diagram - Elasticity and plasticity – Types of stresses and strains- Hooke's law – stress – strain diagram for mild steel – Working stress – Factor ofsafety – Lateral strain, Poisson's ratio and volumetric strain.

UNIT–III:

Power Transmitting Devices:

Belts and belt drives and simple mechanisms, Rope drive, Gears & gear trains; Friction -Types of friction, Friction clutch (cone and single plate). Brakes and bearings (types and applications only); Applications of these devices..

UNIT-IV:

BASICS OF HYDRAULIC MACHINERY:

Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency Elements of a typical Hydropower installation – Heads and efficiencies

UNIT-V:

TURBINES & PUMPS:

Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine –working , velocity

diagram, work done and efficiency, hydraulic design. Draft tube – Classification, functions and efficiency. Pump installation details – classification – work done –losses and efficiencies – specific speed. Multistage pumps – pumps in parallel

TEXT BOOKS:

1. M.V. Seshagirirao and Durgaih, "Engineering Mechanics",University Press.
2. P.N Modi and Seth, "Fluid Mechanics and Hydraulic Machinery",
standard Book House.

REFERENCE BOOKS:

1. B. Bhattacharya, "Engineering Mechanics", Oxford University Publications.
2. Hibbler, "Engineering Mechanics (Statics and Dynamics)", Pearson Education.
3. Fedrinand L. Singer, "Engineering Mechanics" Harper Collings Publishers.
4. A.K.Tayal, "Engineering Mechanics" , Umesh Publication.
5. Domkundwar & Domkundwar, "Fluid mechanics & Hydraulic Machines", Dhanpat Rai & C
6. R.C.Hibbeler, "Fluid Mechanics", Pearson India Education Servieces Pvt. Ltd
7. D.S.Kumar, "Fluid Mechanic & Fluid Power Engineering", Kataria & Sons Publications Pvt. Ltd.
8. Banga & Sharma, "Hydraulic Machines" Khanna Publishers.

Course Outcomes:

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

- Solve problems dealing with forces, beam and understand distributed force systems.
- Solve friction problems and determine moments of Inertia and centroid of practical shapes.
- Understand the inter dependence of the thrust areas in Mechanical Engineering with other core engineering subjects in today's engineering Industry.
- Be conversant with all basic mechanisms, drives, brakes, bearings etc that are essential parts in today's engineering products and consumer systems
- Apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B.Tech EEE–I SEM **L/T/P/C**
3/0/0/3

(R22A0208) MEASUREMENTS AND INSTRUMENTATION

Prerequisites Electrical Circuit Analysis, Analog Electronics, Electro Magnetic Fields.

Course Objectives:

- To impart knowledge on Construction, basic principles of all measuring instruments
- To impart knowledge on working principles of Potentiometers and Instrument transformers
- To acquire knowledge on Wattmeter and Energy meter.
- To study different bridge circuits for finding R LC parameters.
- To understand the basic concepts of smart and digital metering

UNIT - I:

INTRODUCTION TO MEASURING INSTRUMENTS:

Classification of torques – deflecting, control and damping torques ,PMMC expression for the deflecting torque and control torque – Errors and compensations, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of Ammeters using only single shunts resistance and extension of Voltmeters using only single series resistance and simple problems. Quadrant type Electrostatic Voltmeter- expression for the
deflecting torqueand control torque.

UNIT - II:

POTENTIOMETERS & INSTRUMENT TRANSFORMERS:

Principle and operation of D.C. Crompton's potentiometer – standardization A.C. Potentiometers: Drysdale polar and Gall-Tinsley co-ordinate type's standardization – applications.

UNIT - III:

MEASUREMENT OF POWER & ENERGY:

Single phase dynamometer wattmeter, expression for deflecting and control torques, single power factor meter, Single phase induction type energy meter – driving and braking torques – errors and compensations, Measurement of active and reactive powers in balanced

UNIT - IV:

DC & AC BRIDGES:

resistance measuring of low resistance by using Kelvin's double bridge , resistance measuring of medium resistance by using Whetstone's bridge–measurement of high resistance – megger. Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge . Measurement of capacitance –Desauty Bridge , Schering Bridge. Measurement of frequency -Wien's bridge.

UNIT - V:

TRANSDUCERS:

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and LVDT Applications, Capacitance pressure transducer, definition of Strain gauge and Strain Gauge Factor Derivation only

TEXT BOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co Publications, 2005.

2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers 1989.

REFERENCE BOOKS:

1.G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2 Nd Edition, 2016.

2.R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007

3.E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.

4. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.

Course Outcomes: At the end of this course, students will

- demonstrate the ability to Classify measuring instruments and discuss their construction, operation and characteristics.
- Discuss the Potentiometers and Instrument Transformers.
- Demonstrate the working principles of wattmeter and Energy meter.
- Calculate all circuit parameters.
- Classify Transducers and discuss the concepts of smart and digital metering

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/0/0/3

(R22A0203) ELECTRICAL MACHINES-II

Pre requisites: Electrical Circuit Analysis& Electrical Machines-I

Course Objectives:

- To impart knowledge on Construction, principle of operation of three phase induction motors.
- To impart knowledge on the performance, Starting and speed control of three phase induction motors.
- To acquire knowledge on the Alternators.
- To study the concept of parallel operation of alternators and synchronous motors
- To understand operation, construction and types of single-phase motors and their applications in household appliances.

UNIT - I:

THREE PHASE INDUCTION MOTOR:

Constructional details of squirrel cage and slip ring(wound rotor) motors, production of a rotating magnetic field, principle of operation -rotor EMF and rotor frequency – rotor reactance, rotor current and Power factor at stand stilland during operation. Rotor power input, rotor copper loss and mechanical power developed. and their inter relation.

UNIT - II:

CHARACTERISTICS OF THREE PHASE INDUCTION MOTOR:

Torque equation-expressions for maximum torque and starting torque - torque slip characteristic – equivalent circuit - phasor diagram - No-load Test and Blocked rotor test – Predetermination of performance. Applications. Induction generator-principle of Operation.

STARTING AND SPEED CONTROL METHODS: Methods of starting, Methods of speed control Change of voltage, change of frequency, voltage/frequency, and injection of an EMF into rotor circuit (qualitative treatment only).

UNIT - III:

SYNCHRONOUS GENERATOR:

Constructional Features of Cylindrical (round) rotor and salient pole machines –Armature windings – Integral slot and fractional slot windings, Distributed and concentrated windings –distribution, pitch and winding factors – E.M.F Equation.– armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics. Regulation by synchronous impedance method, M.M.F. method and Z.P.F. method.

UNIT - IV:

PARALLEL OPERATION OF SYNCHRONOUS GENERATORS:

Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation And load sharing - Effect of change of excitation and mechanical power input.

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Hunting and its suppression –Methods of starting.

UNIT - V:

SINGLE PHASE MOTORS:

Single phase induction motor – Constructional Features-Double revolving field theory – split-phase motors – Shaded pole motor- AC series motor- Universal Motor- Applications--Stepper Motor- Brushless DC motor.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education,2010

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford,2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.Course Outcomes: At the end of this course students will demonstrate the ability to
5. Discuss the Construction and the principle of operation of three phase induction motors.
   the performance and discuss the methods of Starting and speed control of three phase induction motors.
6. Calculate the voltage regulation of different alternators by using different methods.
7. Discuss the concept of parallel operation of alternators and describe the synchronous motors
8. Classify various types of single-phase motors.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech EEE-II Sem **L/T/P/C**
3/0/0/3

(R22A0461) ANALOG & DIGITAL ELECTRONICS

OBJECTIVES The main objectives of the course are:

1. Learn the concepts of load line analysis and biasing techniques
2. Learn the concepts of small signal analysis of BJT and FET
3. To understand basic number systems codes and logical gates.
4. To introduce the methods for simplifying Boolean expressions
5. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits

UNIT-I

BJT Biasing:

Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self-Bias, Bias Stability, Bias Compensation using Diode and Transistor amplifying action.

Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Determination of h-parameters from transistor characteristics, Typical values of h- parameters in CE, CB and CC configurations

UNIT-II

Transistor at High Frequency:

Hybrid π model of Common Emitter transistor model and derivation of Hybrid π model elements.

FET Amplifiers: Analysis of Common Source and Common Drain JFET Amplifiers, Comparison of performance with BJT Amplifiers

UNIT-III

Number System and Boolean Algebra:

Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code, Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-IV

Minimization Techniques:

The Karnaugh Map Method, Three variables ,Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

UNIT-V

Combinational Circuits:

Design procedure – Half adder, Full Adder, Half sub-tractor, Full sub-tractor, Multiplexer/De-multiplexer Sequential circuits: Latches, Flip-Flops-SR, JK, D, T and master slave, characteristic tables and equation.

TEXT BOOKS:

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications, 2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill.
3. Electronic Devices and Circuits, S.Salivahanan,N.Suresh kumar, McGraw Hill.
4. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 /Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
5. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.S Publications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006
4. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.
5. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2003.

OUTCOMES:

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

1. Design the amplifiers with various biasing techniques
2. Design single stage amplifiers using BJT and FET
3. Understand the basic postulates of Boolean algebra and shows the correlation between Boolean expressions
4. Learn the methods for simplifying Boolean expressions
5. Understand the formal procedures for the analysis and design of combinational circuits and sequential circuits

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II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/0/0/3

(R22A0206) POWER SYSTEM - II

Pre requisite: Power system-1 & Electromagnetic Fields

COURSE OBJECTIVES:

- To know about AC distribution systems
- To understand the concept of voltage control & PF improvement.
- To understand and develop Y bus matrices
- To understand and develop Z bus matrices
- To understand the concepts load flow studies.

UNIT-I:

A.C. DISTRIBUTION:

Introduction, AC distribution, Single phase, 3-phase, 3 phase 4 wire system, bus bar arrangement. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT-II:

VOLTAGE CONTROL & POWER FACTOR IMPROVEMENT:

Introduction – methods of voltage control, shunt and series capacitors, tap changing transformers, synchronous condenser, power factor improvement methods.

UNIT III:

POWER SYSTEM NETWORK MATRICES:

Bus Incidence Matrix, Y-bus formation by Direct and Singular Transformation Methods, Numerical Problems.

UNIT IV:

FORMATION OF Z-BUS:

Partial network, Algorithm for the Modification of Z Bus Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and addition of element between two old buses

UNIT–V

LOAD FLOW STUDIES:

Derivation of Static load flow equations. Load Flow Solutions Using Gauss Seidel Method & Newton Raphson Method (Polar coordinates only): Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flow chart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

TEXT BOOKS:

1. C.L. Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Publishing Co., 2001.
2. D.P.Kothari and I.J.Nagrath, Modern Power System Analysis, 4th Edn, Tata McGraw Hill Education Private Limited2011.

REFERENCE BOOKS:

1. D. P. Kothari: Modern Power System Analysis-Tata McGraw Hill Pub. Co. 2003
2. Hadi Scadat: Power System Analysis – Tata McGraw Hill Pub. Co.2002
3. W.D. Stevenson: Elements of Power system Analysis – McGraw Hill International Student Edition.

COURSE OUTCOMES:

At the end of the course the student will be able to:

- Analyze the operations of AC Distribution systems.
- Analyze voltage Control and Power factor improvement.
- Evaluate the admittance matrix of a given power systems.
- Evaluate the impedance matrix of a given power systems.
- Understand the concept of load flow studies in power system.

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II YEAR B. Tech EEE– II SEM **L/T/P/C**
0/0/2/1

(R22A0471) ANALOG AND DIGITAL ELECTRONICS LAB

COURSE OBJECTIVES:

1. To conduct experiment and plot input and output characteristics of BJT in different configurations.
2. To analyze various amplifiers such as Common Emitter, Common Collector amplifiers
3. To study and verify Basic Gates (AND, OR & NOT), Universal Gates (NAND & NOR) and implement Boolean Functions using the gates.
4. To realize Digital Circuits for various applications.

(For Laboratory Examination – Minimum of 10 experiments)

1. Input and output characteristics of a BJT in CE configuration
2. Input and output characteristics of a BJT in CB configuration
3. Calculation of h-Parameters of CB Configuration from Input and Output Characteristics
4. Calculation of h-Parameters of CE Configuration from Input and Output Characteristics
5. Frequency Response of CE Amplifier
6. Frequency Response of CC Amplifier
7. FET Characteristics
8. Study and verification of Basic Gates (AND, OR &NOT)
9. Study and verification of Universal Gates (NAND &NOR)
10. Implementation of the given Boolean function using logic gates
11. Realization of Half Adder& Full Adder using Basic gates
12. Realization of Half Subtractor & Full Subtractor using Basic gates
13. Multiplexer and De-Multiplexer
14. Encoder and Decoder

COURSE OUTCOMES

1. Conducting experiment and plotting input and output characteristics of BJT in different configurations.
2. Analyze various amplifiers such as Common Emitter, Common Collector amplifiers
3. Studying and verifying Basic Gates (AND, OR & NOT), Universal Gates (NAND & NOR)and implement Boolean Functions using the gates.
4. Realizing Digital Circuits for various application

Major Equipment required for Laboratories:

1. Regulated Power Suppliers, 0-30V 5. 20 MHz, Dual Channel Cathode Ray Oscilloscopes.
2. Functions Generators-Sine and Square wave signals
3. Multi meters
4. Electronic Components

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II YEAR B. Tech EEE– II SEM **L/T/P/C**

-/-/2/1

(R22A0286) MEASUREMENTS AND INSTRUMENTATION LABORATORY

COURSE OBJECTIVES:

The objectives of the course are to make the students learn about:

- To calibrate LPF Watt Meter, energy meter, P.F Meter using electro dynamo meter type instrument as the standard instrument.
- To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges &A.C Bridges.
- To determine three phase active & reactive powers using single wattmeter method practically. Measurement of parameters of choke coil
- To determine the ratio and phase angle errors of currenttransformer and potential transformer.
- Measuring earth resistance, dielectric strength of transformer oil & Testing of underground cables

The following experiments are required to be conducted as compulsory

1. Calibration and Testing of single phase energy Meter
2. Measurement of low resistances by Kelvin's double Bridge
3. Measurement of capacitance by Schering Bridge
4. Measurement of inductance by Anderson Bridge
5. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
6. Calibration of LPF wattmeter by Phantom testing
7. Calibration of dynamometer type power factor meter
8. Measurement of reactive power using single wattmeter in three-phase circuit

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

1. Measurement of voltage, current and resistance using DC potentiometer
2. Measurement of load with the help of strain gauges
3. Measurement of voltage, frequency &phase with the help of CRO
4. Dielectric testing of transformer oil
5. Measurement of Displacement with the help LVDT

TEXT BOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers 1989.

REFERENCE BOOKS:

1.G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016.
2.R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007

3. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.
4. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.

COURSE OUTCOMES:

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

- Calibrate various electrical measuring/recording instruments. Get the ability to choose instruments and can test any instrument can find the accuracy of any instrument by performing experiment can calibrate PMMC instrument using D.C potentiometer.
- Accurately determine the values of inductance and capacitance using a.c bridges Accurately determine the values of very low resistances
- Measure reactive power in 3-phase circuit using single wattmeter
- Determine ratio error and phase angle error of CT
- Students should be able to test current transformers and dielectric strength of oil. Students should be able to calibrate LVDT and resistance strain gauge.

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II YEAR B. Tech EEE– II SEM **L/T/P/C**

0/0/2/1

(R22A0283) ELECTRICAL MACHINES LABORATORY-II

Prerequisite: Electrical Machine-I and Electrical Machines-II

Course Objectives:

- To perform different tests on different Transformers
- To conduct various tests on different Induction motors
- To conduct various tests on different Synchronous Machines

The following experiments are required to be conducted **compulsory** experiments:

1 Sumpner's test on a pair of single-phase transformers
2 Equivalent Circuit of a single-phase induction motor
3 No-load & Blocked rotor tests on three phase Induction motor
4 Regulation of a three –phase alternator by synchronous impedance
5 Regulation of a three –phase alternator by m.m.f. methods
6 Load test on three phase Induction Motor
7 Determination of X_d and X_q of a salient pole synchronous machine
8 'V' and 'Inverted V' curves of a three—phase synchronous motor

In addition to the above eight experiments, **at least any two** of the experiments from the following list are required to be conducted:

1 Scott Connection of transformer.
2 Parallel operation of Single-phase Transformers.
3 Regulation of three-phase alternator by Z.P.F..
4 Measurement of sequence impedance of a three-phase alternator.
5 Efficiency of a three-phase alternator.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education,2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,
2004.

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Determine the Performance of different Transformers using different testing methods.
- Determine the performance of different Induction motors using different testing methods.
- Calculate the Regulation and performance of synchronous machines using different testing methods

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II Year B.Tech. EEE- II Sem **L/T/P/C 2/0/0/0**

(R22A0061) PUBLIC POLICY & GOVERNANCE

Course objectives:

1. To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making.
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trendsin public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy:

Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration.

Approaches to Public Policy Analysis:

The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making:

Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation:

Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance:

Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance:

Rule of Law and Human Rights, Accountability, Participation, Representation.

Techniques of Governance:
Openness and Transparency, Citizen Charter, Social Audit.
Emerging Trends in Public and Private Governance:
An Overview, Market, Civil Society, Information and Communication Technology.

TEXT AND REFERENCE BOOKS:

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts,And Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, OxfordUniversity, Press, 1986.

COURSE OUTCOMES

After completion of the course, student will be able to

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making

III-I

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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(R22A0209)Power Electronics

COURSE OBJECTIVES:

- To get an understanding of Semiconductor devices and systems which have a large application in the power generation, transmission, distribution and utilization.
- To get an in depth understanding of the basic concepts of different types of power Semi-conductor devices and their applications in converters, inverters, choppers, cyclo converter, dual converters, etc.

UNIT - I

POWER SEMI CONDUCTOR DEVICES & COMMUTATION CIRCUITS: Thyristors – ilicon Controlled Rectifiers (SCR's) - Two transistor analogy - Static and Dynamic characteristics - Turn on and turn off methods – Snubber circuit details – Line Commutation and Forced Commutation circuits – Power MOSFET, Power IGBT, their characteristics.

UNIT - II

AC - DC CONVERTERS (1-PHASE & 3-PHASE CONTROLLED RECTIFIERS): Phase control technique – Single phase Line commutated converters –Bridge connections – Half controlled converters with R, RL loads – Derivation of average load voltage and current – Numerical problems. Fully controlled converters, Bridge connections with R, RL loads – Derivation of average load voltage and current. Three phase converters – Three pulse and six pulse converters – Bridge connections average load voltage with R and RL loads – Effect of Source inductance for Single phase-controlled rectifiers – Single phase Dual converters.

UNIT - III

DC - DC CONVERTERS (CHOPPERS):

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL loads- Step up Chopper – load voltage expression.

UNIT - IV

AC - AC CONVERTERS (Qualitative Treatment Only)

AC VOLTAGE CONTROLLERS:

Single phase AC voltage controllers with R and RL loads – Derivationof average load voltage and current, wave forms.

CYCLO CONVERTERS:

Single phase cyclo converters - Types in bridge configuration with R and RLloads.

UNIT - V

DC - AC CONVERTERS (Qualitative Treatment Only):

INVERTERS:

Basics of Inverters – Single phase inverter – Basic series inverter - operation and waveforms - Three phase inverters (120, 180 degrees conduction modes of operation) - Voltage control techniques for inverters, Pulse width modulation techniques.

TEXT BOOKS:

1. Power Electronics, Dr. P. S. Bimbhra, Khanna Publishers
2. Power Electronics, M. D. Singh & K. B. Kanchan Hani, Tata Mc Graw - Hill Publishing Company.

REFERENCE BOOKS:

1. Power Electronics; Circuits, Devices and Applications, M. H. Rashid, Prentice Hall of India.
2. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
3. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
4. Power Electronics, P. C. Sen, Tata Mc Graw-Hill Publishing.

COURSE OUT COMES:

At the end of the course the students get:

- A thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power Semiconductor devices, thyristors nature of the R and RL loads for different power inputs.
- AC-to-DC power conversion through 1-phase & 3-phase controlled rectifiers, DC-to-DC power conversion through step-up and step-down choppers.
- Different types of PWM (pulse-width modulation) techniques, steady-state and transient state analysis of all the power converters, which can be to applied to concepts of real- world electrical and electronics problems & applications.

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III Year B. TECH - I- SEM **L/T/P/C**

3 /0/0/3

(R22A0210)Control Systems

COURSE OBJECTIVES:

1. To learn the basic principles of control system, transfer function representation using block diagram and signal flow graph.
2. To analyze the time response and the effect of different controllers.
3. To study and analyze the different methods of stability in time domain.
4. To understand the frequency domain specifications and different methods of stability in frequency domain.
5. To learn the basic concepts of state space analysis and solutions to time invariant state equations.

UNIT - I:

INTRODUCTION:

Concept of control system, Classification of control systems - Open loop and closed loop control systems, Differences, Examples of control systems- Effects of feedback, Feed Back Characteristics.

TRANSFER FUNCTION REPRESENTATION:

Block diagram algebra, determining the Transfer function from block diagrams, Representation by Signal flow graphs - Reduction using Mason's gain formula – Transfer function of SFG's.

UNIT - II:

TIME RESPONSE ANALYSIS:

Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response, Steady state errors and error constants.

UNIT - III:

STABILITY ANALYSIS IN S-DOMAIN:

The concept of stability – Routh-Hurwitz's stability criterion - Qualitative stability and conditional stability – Limitations of Routh- Hurwitz's stability.

ROOT LOCUS TECHNIQUE:

Concept of root locus - Construction of root locus.

UNIT - IV:

FREQUENCY RESPONSE ANALYSIS:

Introduction, Frequency domain specifications, Bode plot diagrams-Determination of Phase margin and Gain margin, Stability analysis from Bode plots, Polar plots.

UNIT - V:

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:

Concepts of state, state variables and state model, Derivation of state models from block diagrams, Diagonalization, Solving the time invariant state equations, State Transition Matrix and its properties, Concepts of Controllability and Observability.

TEXT BOOKS:

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

REFERRENCE BOOKS:

1. Control Systems Theory and Applications by S. K. Bhattacharya, Pearson.
2. Control Systems Engineering by Palani, TMH.
3. Control Systems by N. K. Sinha, New Age International (P) Limited Publishers.
4. Control Systems by S. Hasan Saeed, KATSONBOOKS
5. Solutions and Problems of Control Systems by A.K. Jairath, CBS Publishers.

COURSE OUTCOMES:

At the end of this course, students would be able to:

1. Explain the basic principles of control system, transfer function representation using block diagram and signal flowgraph.
2. Analyze the time response and effect of different controllers.
3. Study the different methods of stability in time domain.
4. Analyze the frequency domain specifications and stability methods in frequency domain.
5. Explain the basic concepts of state space analysis and solutions to time invariantstate equations.

OPEN ELECTIVE – I

3 /0 /0/3

OPEN ELECTIVE –I
(R22A0251) RENEWABLE ENERGY SOURCES

Pre-requisites: None

Course Objectives:
- To recognize the awareness of energy conservation in students
- To identify the use of renewable energy sources for electrical power generation
- To collect different energy storage methods and detect about environmental effects of energy conversion

Course Out comes:
Costs- Demand side Management Options –Supply side Management Options-Modern Electronic Controls of Power Systems. At the end of the course the student will be able to:
- Understand the principles of wind power and solar photo voltaic power generation, fuel cells.
- Assess the cost of generation for conventional and renewable energy plants
- Design suitable power controller for wind and solar applications and analyze the issues involved in the integration of renewable energy sources to the grid

UNIT-I:
Introduction
Renewable Sources of Energy- Grid- Supplied Electricity- Distributed Generation- Renewable Energy Economics- Calculation of Electricity Generation
Wind Power Plants:
Appropriate Location -Evaluation of Wind Intensity -Topography -Purpose of the Energy Generated – General Classification of Wind Turbines- Rotor Turbines- Multiple-Blade Turbines Drag Turbines- Lifting Turbines- Generators and Speed Control used in Wind Power Energy Analysis of Small Generating Systems.

UNIT-II:
Photo voltaic Power Plants
Solar Energy- Generation of Electricity by Photo voltaic Effect- Dependence of a PV Cell Characteristic on Temperature- Solar cell Output Characteristics-Equivalent Models and Parameters for Photo voltaic Panels- Photo voltaic Systems-Applications of Photo voltaic Solar Energy- Economical Analysis of Solar Energy.
Fuel Cells:
The Fuel Cell- Low and High Temperature Fuel Cells- Commercial and Manufacturing Issues Constructional Features of Proton Exchange- Membrane Fuel Cells– Reformers- Electrolyzer Systems and Related Precautions- Advantages and Disadvantages of Fuel Cells-Fuel Cell Equivalent Circuit- Practical Determination of the Equivalent Model Parameters -Aspects of Hydrogen as Fuel.

UNIT-III:
Induction Generators

Principles of Operation-Representation of Steady- State Operation-Power and Losses Generated-Self-Excited Induction Generator-Magnetizing Curves and Self-Excitation Mathematical Description of the Self-Excitation Process-Interconnected and Stand-alone operation-Speed and Voltage Control - Economical Aspects.

UNIT-IV:

Storage Systems

Energy Storage Parameters-Lead-Acid Batteries-Ultra Capacitors-Flywheels–Super conducting Magnetic Storage System-Pumped Hydroelectric Energy Storage- Compressed Air Energy Storage-Storage Heat-Energy Storage as an Economic Resource.

UNIT-V:

Integration of Alternative Sources of Energy

Principles of Power Injection-Instantaneous Active and Reactive Power Control Approach Integration of Multiple Renewable Energy Sources-Islanding and Interconnection Control-DG Control and Power Injection.

Inter connection Of Alternative Energy Sources with the Grid:

Inter connection Technologies-Standards and Codes for Inter connection-Inter connection Considerations-Inter connection Examples for Alternative Energy Sources.

TEXTBOOKS:

1. Felix A. Farret, M. Godoy Simoes, “Integration of Alternative Sources of Energy”, John Wiley& Sons, 2006.
2. Solanki: Renewable Energy Technologies: Practical Guide For Beginners, PHI Learning Pvt. Ltd., 2008.

REFERENCE BOOKS:

1. D.Mukherjee: Fundamentals of Renewable Energy Systems, New Age International publishers, 2007.
2. Remus Teodorescu, Marco Liserre, PedroRodríguez: Grid Converters for Photo voltaic and Wind Power Systems, John Wiley & Sons, 2011.
3. Gilbert M.Masters: Renewable and Efficient Electric Power Systems, John Wiley& Sons, 2004.

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III Year B. TECH - I- SEM L/T/P/C

3 /0 /0/3

OPEN ELECTIVE–I

(R22A0551)JAVAPROGRAMMING

COURSE OBJECTIVES:

1. To create Java programs that leverage the object-oriented features of the Java language,such as encapsulation, inheritance and polymorphism; Use data types, arrays and strings.
2. Implement error-handling techniques using exception handling,
3. To know about Applets and Event Handling
4. Create and event-driven GUI using AWT components.
5. To learn Multithreading concepts.

UNIT I:

Java Programming-

OOP Concepts, History of Java, Java buzzwords, Data types, Variables, Constants, Scope and Life time of variables, Operators, Type conversion and casting, Control Flow Statements, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, overloading methods and constructors, garbage collection, recursion.

UNIT II:

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

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

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

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

UNIT III:

Exception handling - Benefits of exception handling, exception hierarchy, Classification of exceptions - checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, built in exceptions.

Multi-threading- Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads.

UNIT IV

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

Event Handling: Events, Handling mouse and keyboard events.

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

UNIT V

GUI Programming with Java – AWT class hierarchy, AWT controls - Labels, button, text field, check box, and graphics. Layout Manager – Layout manager types: border, grid and flow. Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- The Complete Reference, 7th edition, Herbert schildt,TMH.

2. Understanding OOP with Java, updated edition, T. Budd, Pearsoneducation.
3. Core Java an integrated approach, dreamtech publication, Dr.R.NageswaraRao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program,P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

COURSE OUTCOMES:

1. An understanding of the principles and practice of object-oriented programming anddesign in the construction of robust, maintainable programs which satisfy theirrequirements;
2. A competence to design, write, compile, test and execute straightforward programsusinga high-level language;
3. An awareness of the need for a professional approach to design and the importanceofgood documentation to the finished programs.
4. Be able to make use of members of classes found in the Java API.
5. Demonstrate the ability to employ various types of constructs and a hierarchy of Javaclasses to provide solution to a given set of requirements.

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III Year B. TECH - I- SEM **L/T/P/C**

3 /0 /0/3

OPEN ELECTIVE –I
WEB DEVELOPMENT

COURSE OBJECTIVES:

Students should be able:

1. To understand the basics of web & html programming
2. To introduce CSS and its style
3. To brief on Java Scripting & Dynamic Html
4. To get acquainted with web server software AJAX
5. To peruse PHP and study the developing environments

UNIT –I:

Web Basics- Introduction, Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser, HTML-Introduction HTML-Basic Formatting Tags, HTML- Grouping Using Div Span, HTML-Lists, HTML-Images, HTML-Hyperlink, HTML-Table, HTML-I frame, HTML – Form HTML – Headers, HTML-Miscellaneous using tool Dreamweaver/ Visual studio

UNIT –II:

CSS –Introduction, Syntax, CSS-Selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS-Lists Tables, CSS-Box Model, CSS-Display Positioning, CSS Floats. Using tool using tool Dreamweaver/ Visual studio, Net Bean

UNIT-III:

Introduction of Java Script, JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script. XML Http Request- Introduction, XML Http Request, The XML Http Request Object, Events for the XML Http Request Object, Request Object for XML Http Request, Response Object for XML Http Request. Using tool using tool Visual studio, Net Bean & Eclipse

UNIT –IV:

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax, CSS to Define Look and Feel, Understand the XML Mark-up, XML Http Request. AJAX using XML and XML Http Request- Introduction, Ajax Using XML and XML Http Request, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML. Using tool using tool Visual studio, Net Bean & Eclipse

Unit-V

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working of AJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query. Using tool using tool Visual studio, Net Bean & Eclipse

TEXT BOOKS:

1. Web Programming, Building Internet Applications, CHRIS BATES II Edition, Wiley Dreamtech.
2. Programming World Wide Web, SEBESTA, PEARSON.

REFERENCE BOOKS:

1. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson

2. Ajax: The Complete Reference By Thomas Powell
3. PHP: The Complete reference-steven Holzer Tata McGraw-Hill.
4. An Introduction to web Design and Programming –Wang-Thomson
5. Web Warrior Guide to Web Programming -Bai/Ekedaw-Thomas
6. Beginning Web Programming-Jon Duckett WROX

COURSE OUTCOMES:

Students will be able:

- To design a web application.
- To build creative style sheets using CSS
- To write java scripts for web application.
- To frame web template using Ajax
- To associate AJAX with PHP

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OPEN ELECTIVE –I
INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. To learn the basics, role, issues and agreement on trade aspects of IPR
2. To know the Parties to IP Rights
3. To learn how to ensure the value ofIP
4. To learn about how to manage IPrights
5. To learn the remedies and IP Revaluation

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.

REFERENCE BOOKS:

1. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2ndEdition.
2. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
3. Intellectual Property Rights: N K Acharya: ISBN:9381849309
4. Intellectual Property Rights: C B Raju: ISBN-8183870341
5. Intellectual Property: Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652

6. Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

COURSE OUTCOMES

1. Understand the basics, role, issues and agreement on trade aspects ofIPR
2. Understand and identifying the Parties to IP Rights
3. Learn how to ensure the value ofIP
4. Understand about how to manage IPrights
5. Learn the remedies and IP Revaluation

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OPEN ELECTIVE –I
ROBOTICS AND AUTOMATION

COURSE OBJECTIVES:

1) To study overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) To study in detail about Robotics and sensors.
3) To study about AVR RISC Microcontroller architecture in detail.
4) To study about ARM Processor in detail.
5) To study about Artificial Intelligence in Robotics.

UNIT -I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics:

Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

The AVR RISC microcontroller architecture:

Introduction, AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory, EEPROM, I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM Processor:

Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS:

Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

[1] Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
[2] Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education, India2003.
[3] ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

[1] M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.

[2] Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech

[3] Microcontrollers and applications, Ajay V Deshmukh, TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to

1) Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) Understand in detail about Robotics and sensors.
3) Understand AVR RISC Microcontroller architecture in detail.
4) Understand about ARM Processor in detail.
5) Understand about Artificial Intelligence in Robotics.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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OPEN ELECTIVE –I
(R22A6751) PRINCIPLES OF DATA SCIENCE

Course Objectives:

- To gain knowledge in the basic concepts of Data Analysis
- To acquire skills in data preparatory and preprocessing steps.
- To understand the mathematical skills in statistics.
- To understand the concepts of Artificial Intelligence Roles and Skills in Data Science.
- To understand the role of Data Science in Real-time applications

UNIT I

INTRODUCTION

Need for data science – benefits and uses – facets of data – data science process – setting the research goal – retrieving data – cleansing, integrating, and transforming data – exploratory data analysis – building the models – presenting and building applications.

UNIT II

DESCRIBING DATA – I

Frequency distributions – Outliers – relative frequency distributions – cumulative frequency distributions – frequency distributions for nominal data – interpreting distributions – graphs – averages – mode – median – mean – averages for qualitative and ranked data – describing variability – range – variance – standard deviation – degrees of freedom – interquartile range – variability for qualitative and ranked data.

UNIT III

DESCRIBING DATA - II

Normal distributions – z scores – normal curve problems – finding proportions – finding scores – more about z scores – correlation – scatter plots – correlation coefficient for quantitative data – computational formula for correlation coefficient – regression – regression line – least squares regression line – standard error of estimate – interpretation of r2 – multiple regression equations – regression toward the mean.

UNIT IV

AI: ROLES AND SKILLS AI:

Cognitive Computing: Learning Perceptions – Terminologies - Machine Learning – Neural Networks – Deep Learning - NLP – Speech Processing – Big Data and AI – Ethics in AI Research - Advanced Applications – AI Myths – Data Science Roles Data Scientist, Data Architect, Data Analyst – Machine Learning Engineer – Skills.

UNIT V

DATA SCIENCE USE CASES

Data Science Use cases Specifications and Discussion – Data Sources Identification – Data Types – Data Classification – Data Characteristics of Big V‟s – Data Science P‟s – Applications of AI: Domains: Customer Insights – Behavioral Analysis –- Marketing – Retails – Insurance – Risk and Security – Health care – Supply Chain Logistics.

Text Books:

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (first two chapters for Unit I)
2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Chapters 1–7 for Units II and III)
3. Joel Grus, "Data Science from Scratch", 2nd Edition, O'Reilly Publisher, ISBN: 9781492041139, May 2019 (for Unit IV and V)

Reference Books:

1. Lillian Pierson, Jake Porway, "Data Science for Dummies", Second Edition, John Wiley & Sons, Publishers, ISBN: 9781119327639, 2017 (EBook)
2. Sinan Ozdemir, Sunil Kakade, "Principles of Data Science", Second Edition (EBook) ELearning Resources:
• Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Course Outcomes:

On successful completion of this course, students would be able to
• Understand the foundational concepts of Data Science.
• Understand the nature of Data.
• Determine the relationship between data dependencies using statistics.
• Understand the concepts of Artificial Intelligence Roles and Skills in Data Science

PROFESSIONAL ELECTIVE - I

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-I
(R22A0211)IOT APPLICATIONS IN ELECTRICAL ENGINEERING

Prerequisite: Programming, Digital Electronics

Course Objectives:

- To learn about a few applications of Internet of Things and distinguish between motion less and motion detectors as IoT applications
- To know about Micro Electro Mechanical Systems (MEMS) fundamentals in design and fabrication process
- To understand about applications of IoT in smart grid and new concept of IoE for various applications

Course Outcomes:

At the end of this course, students will be able to:

- To get exposed to recent trends in few applications of IoT in Electrical Engineering
- To understand about usage of various types of motionless sensors and motion detectors
- To get exposed to various applications of IoT in smart grid
- To get exposed to future working environment with Energy internet

UNIT-I:

Sensors:

Definitions, Terminology, Classification, Temperature sensors, Thermoresistive, Resistance, temperature detectors, Semiconductor, Piezoelectric, Humidity and moisture sensors. Capacitive, Electrical conductivity, time domain reflectometer, Pressure and Force sensors:Strain and tactile sensors, Strain gauge, Piezoelectric.

UNIT-II:

Occupancy and Motion detectors:

Capacitive occupancy, Inductive and magnetic, potentiometric - Position, displacement and level sensors, Capacitive, Inductive, magnetic velocity and acceleration sensors, piezoelectric cables, Electromagnetic, Acoustic sensors -Resistive microphones, Photo resistors.

UNIT-III:

MEMS:

Basic concepts of MEMS design, Beam/diaphragm mechanics, Process design of MEMS based sensors and actuators, Touch sensor, Pressure sensor, RF MEMS switches, Electric and Magnetic field sensors.

UNIT-IV:

IoT for Smart grid:

Driving factors, Generation level, Transmission level, Distribution level, Applications, Metering and monitoring applications, Standardization and interoperability, Smart home.

UNIT-V:

Internet of Energy:

Concept of Internet of Energy, Evaluation of IoE concept, Vision and motivation of IoE, Architecture, Energy routines, information sensing and processing issues, Energy internet as smart

grid

TEXT BOOKS:

1. 1.Jon S. Wilson, “Sensor Technology Hand book”, Newnes Publisher, 2004
2. Tai Ran Hsu, “MEMS and Microsystems: Design and manufacture”, 1st Edition, McGraw hill Education, 2017
3. Ersan Kabalci and Yasin Kabalci, “From Smart grid to Internet of Energy”, 1st Edition, Academic Press, 2019.

REFERENCE BOOKS:

1. Raj Kumar Buyya and Amir Vahid Dastjerdi, “Internet of Things: Principles and Paradigms”, Kindle Edition, Morgan Kaufmann Publisher, 2016
2. Yen Kheng Tan and Mark Wong, “Energy Harvesting Systems for IoT Applications”: Generation, Storage and Power Management, 1st Edition, CRC Press, 2019
3. RMD Sundaram Shriram, K. Vasudevan and Abhishek S. Nagarajan, “Internet of Things”, Wiley, 2019.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-I
(R22A0212)CYBER-PHYSICAL SYSTEM

Course Objectives:

- To gain insight into the seamless integration of computational algorithms and physical processes within cyber-physical systems.
- To develop proficiency in analyzing and managing the dynamic interactions between the cyber and physical components in diverse applications.
- To explore practical applications, focusing on the design, implementation, and optimization of cyber-physical systems for real-world

Course Outcomes:

At the end of the course the student will be able to:

- Achieve a thorough understanding of the core principles that form the foundation of CyberPhysical Systems.
- Apply the knowledge to successfully identify safety specifications and critical properties crucial for ensuring the safety of CPS.
- Develop proficiency in utilizing abstraction techniques for system designs, and effectively express pre- and post-conditions as well as invariants for CPS models.

UNIT-I:

Introduction to Cyber-Physical Systems (CPS):

Cyber-Physical Systems in the real world, Basic principles of design and validation of CPS, Industry 4.0 and its implications, Auto SAR and IIOT (Industrial Internet of Things), Applications in Building Automation and Medical CPS.

UNIT-II:

CPS Platform Components:

CPS Hardware platforms: Processors, Sensors, Actuators, CPS Network: Wireless Hart, CAN, Automotive Ethernet, CPS Software stack: Real-Time Operating Systems (RTOS), Scheduling, Overview of CPS Software components and their mapping to Electronic Control Units (ECUs).

UNIT-III:

Principles of Automated Control Design:

Dynamical Systems and Stability, Controller Design Techniques, Stability Analysis using Common Lyapunov Functions (CLFs) and Multiple Lyapunov Functions (MLFs), Performance analysis under Packet drop and Noise.

UNIT-IV:

CPS Implementation and Performance Analysis:

Translating features into software components, Mapping software components to ECUs, Performance Analysis of CPS, considering scheduling, bus latency, and faults, Network congestion and its impact on control performance.

UNIT-V:

Formal Methods, Software Analysis, and Secure Deployment:

Advanced Automata-based modeling and analysis, Timed and Hybrid Automata for CPS, Formal

Analysis techniques: Flow pipe construction, reachability analysis, Analysis of CPS Software: Weakest Pre-conditions, Bounded Model Checking, Frama-C, CBMC, Secure Deployment of CPS: Attack models, Secure Task mapping, and Partitioning, State estimation for attack detection.
Case Studies in CPS Automotive Case Study: Vehicle ABS hacking,
Power Distribution Case Study: Attacks on Smart Grids

TEXT BOOKS:

1. Raj Rajkumar, Dionisio De Niz, and Mark Klein, Cyber-Physical Systems, ddison-Wesley Professional
2. Rajeev Alur, Principles of Cyber-Physical Systems, MIT Press, 2015.

REFERENCE BOOKS:

1. André Platzer, Logical Analysis of Hybrid Systems: Proving Theorems for Complex Dynamics., Springer, 2010. 426 pages, ISBN 978-3-642-14508-7.
2. Jean J. Labrosse, Embedded Systems Building Blocks: Complete and Ready-To-Use Modules in C, The publisher, Paul Temme, 2011.
3. Introduction to Embedded Systems - A Cyber-Physical Systems Approach, by E. A. Lee and S. A. Seshia, 2014. The book is available in two forms: a free PDF download and low-cost paperback.

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III Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-I
(R22A0213)COMPUTER AIDED ELECTRICAL MACHINE DESIGN

Prerequisite: Electrical Machines-I, Electrical Machines-II

Course Objectives:

- To know the major considerations in electrical machine design, electrical engineering materials, space factor, choice of specific electrical and magnetic loadings,
- To analyze the thermal considerations, heat flow, temperature rise, rating of machines.
- To understand the design of machines and CAD design concepts

Course Outcomes: At the end of this course, students will be able to:

- Understand the construction and performance characteristics of electrical machines.
- Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines
- Understand the principles of electrical machine design and carry out a basic design of an ac machine using software tools.

UNIT-I:

Introduction:

Major considerations in electrical machine design, electrical engineering materials, space factor, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines.

UNIT-II:

Transformers:

Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, operating characteristics, regulation, no load current, temperature rise in transformers, design of cooling tank, methods for cooling of transformers.

UNIT-III:

Induction Motors:

Sizing of an induction motor, main dimensions, length of air gap, rules for selecting rotor slots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, magnetic leakage calculations, leakage reactance of poly-phase machines, magnetizing current, short circuit current, circle diagram, operating characteristics.

UNIT-IV:

Synchronous Machines:

Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of airgap length, design of rotor, design of damper winding, determination of full load field mmf, design of field winding, design of turbo alternators, rotor design.

UNIT-V:

Computer Aided Design (CAD):

Limitations (assumptions) of traditional designs need for CAD analysis, synthesis and hybrid methods, design optimization methods, variables, constraints and objective function, problem

formulation. Introduction to FEM based machine design. Introduction to complex structures of modern machines-PMSMs, BLDCs, SRM and claw-pole machines.

TEXT BOOKS:

1. A. K. Sawhney, "A Course in Electrical Machine Design", Dhanpat Rai and Sons, 1970.
2. M.G. Say, "Theory & Performance & Design of A.C. Machines", ELBS London.

REFERENCE BOOKS:

1. S. K. Sen, "Principles of Electrical Machine Design with computer programmes", Oxford and IBH Publishing, 2006.
2. K. L. Narang, "A Text Book of Electrical Engineering Drawings", Satya Prakashan, 1969.
3. A. Shanmugasundaram, G. Gangadharan and R. Palani, "Electrical Machine Design Data Book", New Age International, 1979.
4. M. V. Murthy, "Computer Aided Design of Electrical Machines", B.S. Publications, 2008.
5. Electrical machines and equipment design exercise examples using Ansoft's Maxwell 2D machine design package.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

Course Objective:
To learn the basic business types, impact of the economy on Business and Firms specifically .To analyze the Business from the Financial Perspective.

Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analyzing the Financial Statements of a Company.

UNIT–I:
Introduction to Business and Economics
Business:
Structure of Business Firm, Types of Business Entities, Limited Liability Companies, Sources of Capitalfora Company, Non-Conventional Sources of Finance.
Economics:
Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle Features and Phases. Nature and Scope of Business Economics, Role of Business Economist, Multi disciplinary nature of Business Economics.

UNIT-II:
Demand and Supply Analysis
Elasticity of Demand:
Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Steps in Demand Forecasting, Methods of Demand Forecasting.
Supply Analysis: Determinants of Supply, Supply Function and Law of Supply.

UNIT-III:
Production, Cost, Market Structures& Pricing
Production Analysis: Factors of Production, Production Function with one variable input, two variable inputs, Returns to Scale.
Cost analysis: Types of Costs, Short run and Long run Cost Functions.
Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition.
Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT - IV: Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts,

Formats for Preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT - V: Financial Ratios Analysis: Concept of Ratio Analysis, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios –Analysis and Interpretation (simple problems).

TEXTBOOKS:

1. Ramachandran Aryasri, Business Economics and Financial Analysis, McGraw-Hill, 2020.
2. D.D.Chaturvedi,S.L.Gupta, Business Economics-Theory and Applications, International Book House Pvt.Ltd.2013.
3. Dhanesh K Khatri, Financial Accounting,TataMc–GrawHill,2011.
4. Geethika Ghosh, Piyali Gosh,Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt.Ltd.2012.

REFERENCEBOOKS:

1. PareshShah,FinancialAccountingforManagement2e,OxfordPress,2015.
2. S.N.Maheshwari,SunilKMaheshwari,SharadKMaheshwari,FinancialAccounting,5e,VikasPublications,2013.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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(R22A0287)CONTROL SYSTEM LABORATORY

COURSE OBJECTIVES:

1. To study the system performance using time domain analysis and methods for improving it.
2. To assess the system performance using frequency domain analysis and techniques for improving the performance to design various controllers and compensators to improve system performance.
3. To design various controllers and compensators to improve system performance.
4. To study the characteristics of servo mechanisms which are helpful in automatic control systems?
5. To understand the different ways of system representations such as transfer function representation and state space representations and to assess the system dynamic response.

PART-A

The following experiments are required to be conducted compulsory experiments:

1. Time response of Second order system
2. Characteristics of Synchro's
3. Effect of feedback on DC servomotor
4. Transfer function of DC motor
5. Transfer function of DC generator
6. Characteristics of AC servo motor
7. Temperature controller using PID
8. Effect of P, PD, PI, PID Controller on a second order systems

PART-B

In addition to the above eight experiments, at least any two of the experiments from the Following list are required to be conducted

9. Lag and lead compensation – Magnitude and phase plot.
10. Programmable logic controller- Study and verification of truth tables of logic gates, Simple Boolean expressions.
11. a) Simulation of P, PI, PID Controller.
    b) Linear system analysis (Time domain analysis, Error analysis) using suitable software
12. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using Suitable software
13. State space model for classical transfer function using suitable software – Verification.
14. Design of Lead-Lag compensator for the given system and with specification using Suitable software

COURSE OUTCOMES:

At the end of the course, students would be able to:

1. Determine the performance and time domain specifications of first order systems.
2. Analyze various time domain and frequency domain techniques to assess the system performance.
3. Study the system performance by selecting a suitable controller and/or a compensator for a specific application.
4. Get the knowledge about the effect of poles and zeros location on transient and steady state behavior of second order systems and can implement them to practical systems.
5. Study system controllability and observability using state space representation and applications of state space representation to various systems.

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III Year B. TECH - I- SEM **L/T/P/C**

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(R22A0288)POWER ELECTRONICS LABORATORY

COURSE OBJECTIVES:

The student will understand:

- The characteristics of power electronic devices.
- The operation of single-phase voltage controller, converters and Inverters circuits with Rand RL loads. Analyze the TPS7A4901, TPS7A8300 and TPS54160 buck regulators.

Among the following experiments any 10 are to be conducted:

1. Study the Characteristics of SCR, MOSFET & IGBT
2. Single Phase half-controlled converter with R load and RL loads
3. Single Phase fully controlled bridge converter with R and RL loads
4. Single Phase AC Voltage Controller with R and RL Loads
5. Single Phase Cyclo - converters with R and RL loads
6. Single Phase series inverter with R and RL loads
7. DC Chopper with R and RL Loads
8. Speed control of PMDC motor using MOSFET
9. Three Phase half-controlled bridge converter with R-load
10. Single Phase dual converter with RL loads
11. Single-phase full converter using RLE loads using PSPICE
12. Single-phase AC voltage controller using RLE loads using PSPICE.
13. Resonant pulse commutation circuit using PSPICE.
14. Buck chopper using PSPICE.
15. Single phase Inverter with PWM control using PSPICE.

COURSE OUTCOMES:

After completion of this course, the student is able to

- Understand the operating principles of various power electronic converters.
- Use power electronic simulation packages& hardware to develop the power converters.
- Analyze and choose the appropriate converters for various applications

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - I- SEM **L/T/P/C**

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(R22A0084)PROFESSIONAL DEVELOPMENT SKILL -I

1. Introduction:

The introduction of the Advanced English Communication Skills Lab is considered essential at the B.Tech 3rd year level. At this stage, the students need to prepare themselves for their career which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use appropriate English and perform the following:

1. Gathering ideas and information to organize ideas relevantly and coherently.
2. Making oral presentations.
3. Writing formal letters.
4. Transferring information from non-verbal to verbal texts and vice-versa.
5. Writing project/research reports/technical reports.
6. Participating in group discussions.
7. Engaging in debates. 8. Facing interviews.
8. Taking part in social and professional communication.

2.Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, with a focus on vocabulary
- To enable them to listen to English spoken at normal conversational speed by educated English
- speakers To respond appropriately in different socio-cultural and professional contexts
- To communicate their ideas relevantly and coherently in writing
- To prepare the students for placements.

3. Syllabus:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. Activities on Listening and Reading Comprehension:

Active Listening – Development of Listening Skills Through Audio clips - Benefits of Reading – Methods and Techniques of Reading – Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers - Subskills of reading - Reading for facts, negative facts and Specific Details- Guessing Meanings from Context, Inferring Meaning - Critical Reading — Reading Comprehension – Exercises for Practice.

2. Activities on Writing Skills: Vocabulary for Competitive Examinations - Planning for Writing – Improving Writing Skills - Structure and presentation of different types of writing – Free Writing and Structured Writing - Letter Writing –Writing a Letter of Application –Resume vs. Curriculum Vitae – Writing a Résumé – Styles of Résumé - e-Correspondence – Emails – Blog Writing - (N)etiquette – Report Writing – Importance of Reports – Types and Formats of Reports– Technical Report Writing– Exercises for Practice.

3. Activities on Presentation Skills - Starting a conversation – responding appropriately and relevantly – using the right language and body language – Role Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission,

Participating in a Small Talk – Oral presentations (individual and group) through JAM sessions- PPTs – Importance of Presentation Skills – Planning, Preparing, Rehearsing and Making a

Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports – Checklist for Making a Presentation and Rubrics of Evaluation

4. Activities on Group Discussion (GD): Types of GD and GD as a part of a Selection Procedure - Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas – Do's and Don'ts - GD Strategies – Exercises for Practice

5. Interview Skills: Concept and Process - Interview Preparation Techniques - Types of Interview Questions – Pre-interview Planning, Opening Strategies, Answering Strategies - Interview Through Tele-conference & Video-conference - Mock Interviews.

4. Minimum Requirement:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- One PC with latest configuration for the teacher
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- TOEFL& GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- Oxford Advanced Learner's Dictionary, 10th Edition
- Cambridge Advanced Learner's Dictionary
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech

6. Books Recommended:

1. Rizvi, M. Ashraf (2018). Effective Technical Communication. (2nd ed.). McGraw Hill Education (India) Pvt. Ltd.
2. Suresh Kumar, E. (2015). Engineering English. Orient BlackSwan Pvt. Ltd.
3. Bailey, Stephen. (2018). Academic Writing: A Handbook for International Students. (5th Edition). Routledge.
4. Koneru, Aruna. (2016). Professional Communication. McGraw Hill Education (India) Pvt. Ltd.
5. Raman, Meenakshi & Sharma, Sangeeta. (2022). Technical Communication, Principles and Practice. (4TH Edition) Oxford University Press.
6. Anderson, Paul V. (2007). Technical Communication. Cengage Learning Pvt. Ltd. New Delhi.
7. McCarthy, Michael; O'Dell, Felicity & Redman, Stuart. (2017). English Vocabulary in Use Series. Cambridge University Press
8. Sen, Leela. (2009). Communication Skills. PHI Learning Pvt Ltd., New Delhi.
9. Elbow, Peter. (1998). Writing with Power. Oxford University Press.
10. Goleman, Daniel. (2013). Emotional Intelligence: Why it can matter more than IQ. Bloomsbury Publishing

III-II

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**
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(R22A0214)POWER SYSTEM PROTECTION

Pre-requisites: Power Systems-I, Power Systems-II

Course Objectives:

- To introduce all kinds of circuit breakers and relays for protection of Generators, Transformers and feeder bus bars from Over voltages and other hazards.
- To describe neutral grounding for overall protection.
- To understand the phenomenon of Over Voltages and its classification.

Course Outcomes:

At the end of the course the student will be able to:

- Compare and contrast electromagnetic, static and microprocessor-based relays
- Apply technology to protect power system components.
- Analyze quenching mechanisms used in air, oil and vacuum circuit breakers

UNTI-I:

Protective Relays:

Introduction, Need for power system protection, effects of faults, evolution of protective relays, zones of protection, primary and backup protection, essential qualities of protection, classification of protective relays and schemes, current transformers, potential transformers, basic relay terminology.

Operating Principles and Relay Construction:

Electromagnetic relays, thermal relays, static relays, microprocessor based protective relays

UNTI-II:

Over-Current Protection:

Time-current characteristics, current setting, over current protective schemes, directional relay, protection of parallel feeders, protection of ring mains, Phase fault and earth fault protection, Combined earth fault and phase fault protective scheme, Directional earth fault relay.

Distance Protection:

Impedance relay, reactance relay, MHO relay, input quantities for various types of distance relays, Effect of arc resistance, Effect of power swings, effect of line length and source impedance on the performance of distance relays, selection of distance relays, MHO relay with blinders, Reduction of measuring units, switched distance schemes, auto re-closing.

UNTI-III:

Pilot Relaying Schemes:

Wire Pilot protection, Carrier current protection.

AC Machines and Bus Zone Protection:

Protection of Generators, Protection of transformers, Bus zone protection, frame leakage protection.

UNTI-IV:

Static Relays:

Amplitude and Phase comparators, Duality between AC and PC, Static amplitude comparator, integrating and instantaneous comparators, static phase comparators, coincidence type of phase comparator, static over current relays, static directional relay, static differential relay, static distance

relays, Multi input comparators, concept of Quadrilateral and Elliptical relay characteristics.

Microprocessor Based Relays:

Advantages, over current relays, directional relays, distance relays.

UNTI-V:

Circuit Breakers:

Introduction, arcing in circuit breakers, arc interruption theories, re-striking and recovery voltage, resistance switching, current chopping, interruption of capacitive current, oil circuit breaker, air blast circuit breakers, SF6 circuit breaker, operating mechanism, selection of circuit breakers, high voltage DC breakers, ratings of circuit breakers, testing of circuit breakers.

Fuses:

Introduction, fuse characteristics, types of fuses, application of HRC fuses, discrimination.

TEXT BOOKS:

1. Badriram and D.N. Vishwakarma, Power System Protection and Switchgear, TMH 2001.
2. U. A. Bakshi, M. V. Bakshi: Switchgear and Protection, Technical Publications, 2009.

REFERENCE BOOKS:

1. C. Russel Mason – "The art and science of protective relaying, Wiley Eastern, 1995
2. L. P. Singh "Protective relaying from Electromechanical to Microprocessors", New Age International

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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MICROPROCESSORS& MICROCONTROLLERS

COURSE OBJECTIVES:

1. To understand the basics of microprocessors and microcontrollers architectures and its functionalities.
2. To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
3. To design and develop Microprocessor/ microcontroller-based systems for real time applications using low level language like ALP.
4. To understand the concepts of ARM processor.

UNIT –I

8086 ARCHITECTURES:

Architecture of 8086, Register Organization, 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:

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.Memory Interfacing to 8086, Interrupt Structure of 8086, Interrupt Vector Table.

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.

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 Edition2006.
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 Edition2006.
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 GAGibson, PHI, 2ndEd.
4. Microcontrollers and Application – Ajay. V. Deshmukh, TMGH,2005.

COURSE OUTCOMES:

After going through this course, the student will

1. Learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. Learn hardware and software interaction and integration.
3. Learn the design of microprocessors/microcontrollers-based systems

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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DIGITAL SIGNAL PROCESSING

Pre-requisites: Laplace Transforms, Numerical Methods and Complex variables, Control Systems

Course Objectives:

- Provide foundational knowledge for the analysis and processing of digital signals.
- Explore the relationships between continuous-time and discrete-time signals and systems, emphasizing time, frequency, and Z-plane analysis.
- Introduce real-world signal processing applications while studying the design and structures of digital filters, including IIR and FIR, and addressing finite word length effects.

Course Outcomes:

At the end of this course, students will be able to:

- Demonstrate proficiency in performing time, frequency, and Z-transform analysis on signals and systems.
- Understand the inter-relationship between DFT and various transforms, appreciate the significance of filter structures, and recognize the effects of round-off errors in the design.
- Apply knowledge to design digital filters, comprehend fast computation methods such as FFT, and understand trade-offs between normal and multi-rate DSP techniques, including finite length word effects.

UNIT-I:

Introduction:

Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, conversion of continuous to discrete signal, Normalized Frequency, Linear Shift Invariant Systems, Stability, and Causality, linear differential equation to difference equation, 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 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, Spectral Transformations.

UNIT-IV:

FIR Digital Filters:

Characteristics of FIR Digital Filters, Frequency Response, and Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT-V:

Multi-Rate Digital Signal Processing:

Introduction, Down Sampling, Decimation, Up sampling, Interpolation, Sampling Rate Conversion, Conversion of Band Pass Signals, Concept of Resampling, 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, Tradeoff between Round Off and Overflow Noise, Measurement of Coefficient Quantization Effects through Pole-Zero Movement, 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.

REFERENCE BOOKS:

1. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009
2. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
3. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
4. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachorand Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

OPEN ELECTIVE-II

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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OPEN ELECTIVE-II

(R22A0252)ELECTRICAL& HYBRID VEHICLES

Prerequisite: Electrical Machines I, Electrical Machines II, Power Electronics

COURSE OBJECTIVES:

1. To understand the basic working and characteristic performance of EHV & PHEVs.
2. To study and understand the basic functioning of both Electric and Hybrid vehicles and the drive train topologies.
3. To study in detail electric propulsion systems, types of motors in Electric vehicles.
4. To understand the different concepts of charging related to both EHV & PHEV operation & energy management.
5. To study and understand different possible energy storage systems for both EHV & PHEV

UNIT 1:

INTRODUCTION TO EV: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, Classification of EV.

ARCHITECTURE OF HEV: Series HEV, Parallel HEV and Series-Parallel HEV, Power flow control in hybrid drive train topologies: Series hybrid drive train, Parallel hybrid drive train and Series- Parallel hybrid drive train.

UNIT 2:

FUNDAMENTALS OF ELECTRIC VEHICLES: General description of vehicle movement, Vehicle resistance: Rolling Resistance, Aerodynamic drag, Grading resistance, Dynamic Equation, Vehicle Transmission Characteristics : Manual gear transmission and Hydro dynamic transmission, Vehicle performance: Maximum Cruising Speed, Gradeability, Acceleration performance.

UNIT 3:

PLUG-IN HYBRID ELECTRIC VEHICLES: Introduction, Functions and Benefits of PHEV, Operating Principles of Plug-in Hybrid Vehicle: Charge-Depleting Mode, Charge-Sustaining Mode, AER Mode, Engine-Maintenance Mode, And Control Strategy of PHEV

FUNDAMENTALS OF CHARGERS: Charger Classification and Standards, Charger Requirements, Topology Selection for Level 1 and 2 AC Chargers: Front-End AC–DC Converter Topologies

UNIT 4:

ELECTRIC PROPULSION SYSTEMS: Introduction to electric components used in HEV's, DC Motor drives: Combined armature and Field Control method, Chopper control DC drives, Multi quadrant control of Chopper fed DC drive.

PERMANENT MAGNET BLDC MOTOR DRIVES: Closed loop Torque control of BLDC motor drive and Sensorless Control of BLDC Motor drive using Back EMF method

UNIT 5:

ENERGY STORAGE: Introduction to Energy Storage Requirements in Electric Vehicles, Battery Parameters, Battery based energy storage: Lead acid battery, Lithium Ion Battery and Super Capacitor based energy storage, Fuel Cell based energy storage, Hybridization of different energy storage devices.

TEXT BOOKS:

1. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design", CRC Press, 2004.
2. Ali Emadi, "Advanced Electrical Hybrid Vehicles" CRC Press, 2015, Taylor & FrancisGroup.
3. C. Mi, M. A. Masrur and D. W. Gao, "Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives", John Wiley & Sons, 2011.

REFERENCE BOOKS:

1. T. Denton, "Electric and Hybrid Vehicles", Routledge,2016
2. S. Onori, L. Serrao and G. Rizzoni, "Hybrid Electric Vehicles: Energy Management Strategies", Springer, 2015.

COURSE OUTCOMES:

At the end of this course, students would be able to:

1. Get a good understanding of the basic functioning of both Electric and Hybrid vehicles and their performance.
2. Develop a good concept of the electrical vehicle modeling and its power plantcharacteristics
3. To understand the fundamentals of chargers related to both electric & hybrid vehicle operation & energy management
4. Have a detailed understanding of electric propulsion systems, types of motors and the other important subsystems in Electric vehicles.
5. Have clear concepts of the different possible energy storage systems for both electric and hybrid vehicles.

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III Year B. TECH - II- SEM **L/T/P/C**

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OPEN ELECTIVE-II

(R22A6753)BIG DATA ARCHITECTURE

COURSE OBJECTIVES

To learn

1. To introduce the terminology, technology and its applications
2. To introduce the concept of Analytics and Visualization
3. To demonstrate the Big Data Architecture and its components, tools

UNIT I

Big Data Introduction:

Classification of Digital Data, Structured and Unstructured Data, Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data, Why Big Data - Traditional Business Intelligence versus Big Data, Importance of Big Data.

UNIT II:

Big Data Architecture Introduction:

Big Data Architecture- Definition, Why Big Data Architecture. Evolution of Big Data Architecture. Market Trends. Big Data Architecture and Its Sources. Big Data Architecture Use Cases.

UNIT-III

Big Data architecture components:

Data ingestion, Data storage, Data Computing, Data Analysis, Data Visualization. Understanding the Lambda architecture, HBase, Spark Libraries, Spark Streaming.

UNIT IV

Introducing Apache Spark:

Introduction to Spark, Spark Architecture and its components, Features of Spark, Spark vs Hadoop, Challenges of Spark.

UNIT V

Introduction To Technology Landscape

NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

TEXT BOOKS:

1) Tom White ― Hadoop: The Definitive Guide‖ Third Edit on, O'Reilly Media, 2012.

2) Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCE BOOKS:

3) Michael Berthold, David J. Hand, "Intelligent Data Analysis‖, Springer, 2007.
4) Jay Liebowitz, ―Big Data and Business Analytics‖ Auerbach Publications, CRC press (2013)
5) Tom Plunkett, Mark Hornick, ―Using R to Unlock the Value o f Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop‖, McGraw- Hill/Osborne Media (2013), Oracle press.
6) Glen J. Myat, ―Making Sense of Data‖, John Wiley & Sons, 2007
7) Pete Warden, ―Big Data G lossary‖, O 'Reily, 2011.
8) Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9) ArvindSathi, ―Big Data Analytics: Disruptive Technologies for Changing the Game‖, MC Press, 2012
10) Paul Zikopoulos, Dirk DeRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corigan, "Harness the Power of Big Data the IBM Big Data Platform ", Tata McGraw Hill Publications

COURSE OUTCOMES:

Upon successful completion of the course, the student is able to
1) Identify Big Data and its Business Implications.
2) Categorize and summarize Big Data and its importance.
3) Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce in big data analytics
4) Compare various file systems and use an appropriate file system for storing different types of data.
5) Connect to web data sources for data gathering, integrate data sources with Hadoop components to process streaming data.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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OPEN ELECTIVE-II

(R22A0352)DESIGN THINKING

COURSE OBJECTIVES:

1. To understand the engineering design process and identification of customer need.
2. To understand innovative problem-solving concepts.
3. To understand the principles of Design for Manufacturing and FMEA.
4. To know about the design for assembly principles.
5. To know about the concepts of design for environment and design for recycling.

UNIT-I

Introduction:

Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.

Identification of Customer Need:

Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing:

Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly:

Assembly Principles, Process, Worksheet, Assumptions. Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment:

Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. GenrichAltshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

REFERENCE BOOKS

1. The Art of Innovation, by Tom Kelley.
2. Design Thinking, by Nigel Cross.
3. The Design of Business: by Roger Martin.

COURSE OUTCOMES:

1. The importance of design in innovation.
2. Design tools and processes can generate innovative new ideas.
3. Design and design thinking to innovative in areas such as engineering, software development and business operations.
4. Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
5. To describe the various case studies for design for environment.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**
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OPEN ELECTIVE-II

PRINCIPLES OF CLOUD COMPUTING

COURSE OBJECTIVES:

1. To learn various system models for Distributed and Cloud Computing.
2. To understand about Virtual machines, Its Structure and mechanisms.
3. To learn Cloud Computing Paradigm.
4. To introduce the various levels of services that can be achieved by cloud.
5. To describe the security aspects in cloud.

UNIT- I

Systems Modeling:

System Models for Distributed and Cloud Computing- Cloud Computing
In a Nutshell, Layers and Types of Clouds, Desired Features of a Cloud, Infrastructure as a ServiceProviders, PlatformasaServiceProviders,ChallengesandRisks.

UNIT- II

Virtualization:

Virtualmachines ,Implementation Levels of Virtualization ,Virtualization Structures / Toolsand Mechanisms, Virtualization of CPU, Memory, and I/O Devices.

UNIT- III

Foundations:

Roots of Cloud Computing, Broad Approaches to migrating into the Cloud,
The Seven-Step Model of Migration into a Cloud. Relevant Deployment Models for Enterprise Cloud Computing.

UNIT- IV

InfrastructureasaService(IAAS)&Platform(PAAS):

Virtual machines provisioning
And Migration services-Background and Related Work, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services. The Anatomy of Cloud Infrastructures, Distributed Management of Virtual Infrastructures. Aneka Cloud Platform.

UNIT- V

Software as a Service (SAAS) &Data Security in the Cloud:

Google App Engine,
An Introduction to the idea of Data Security-The Current State of Data Security
In the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

TEXTBOOKS:

1) Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, ElsevierIndia2012.
2) Cloud Computing Principles and Paradigms- Raj Kumar Buyya, James Broberg, Andrzej Goscinski,A John Wiley & Sons Publication,2011

3) Mastering Cloud Computing-RajKumarBuyya,Christin Vecchiolaand S.TanuraiSelvi,TMH,2012.
4) MichaelMiller,CloudComputing:Web-BasedApplicationsThatChangetheWayYouWorkand CollaborateOnline,QuePublishing,August200

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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OPEN ELECTIVE-II

(R22A6951) INTERNET OF THINGS AND ITS APPLICATIONS

COURSE OBJECTIVES:

1) To study IoT Networking Core
2) To study IoT related network fundamentals
3) To study IoT Architecture.
4) To study IoT Application Development procedure
5) To study various case studies and IoT applications.

UNITI:

FUNDAMENTALS OF IoT-

Evolution of Internet of Things, Enabling Technologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II:

IoT PROTOCOLS-

IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks,6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

UNIT III:

DESIGN AND DEVELOPMENT-

Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, Arduino Board details

UNIT IV:

DATA ANALYTICS AND SUPPORTING SERVICES:

Data Analytics: Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M, Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud Service Models.

UNIT V:

CASE STUDIES/INDUSTRIAL APPLICATIONS:

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments, Industry 4.0 concepts.

TEXT BOOKS:

1. 6LoWPAN:TheWirelessEmbeddedInternet,ZachShelby,CarstenBormann,Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Eco systems, Dr.Ovidiu Vermesan, Dr.Peter Friess, RiverPublishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang,Laurence T.Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach), Vijay Madisetti, Arshdeep Bahga
3. Designing the Internet of Things, Adrian McEwen (Author),Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "MobileComputing,"Tata Mc Graw Hill, 2010.
5. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-onApproach)", 1st Edition,VPT, 2014
6. Computer Networks; By: Tanenbaum, AndrewS; Pearson Education Pte.Ltd., Delhi, 4 thEdition
7. Data and Computer Communications; By: Stallings, William; Pearson Education Pte.Ltd., Delhi, 6th Edition

COURSE OUTCOMES:

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

1) Understand IoT Networking Core
2) Understand IoT related network fundamentals
3) Understand IoT Architecture.
4) Understand IoT Application Development procedure
5) Understand various case studies and IoT applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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OPEN ELECTIVE-II

(R22A2152) NANO TECHNOLOGY

Course objectives

1. To provide a comprehensive over view of synthesis and characterization of nano particles, Nano composites and hierarchical materials with Nano scale features.
2. To provide the engineering students with necessary back ground for understanding various nano material's characterization techniques
3. To develop an understanding of the basis of the choice of material for device applications
4. To give an insight into complete systems where nano technology can be used to improve our every day life

UNIT I:

Introduction to Nanomaterials

Nano technology, Frontier of future-an overview, Length Scales, Variation of physical properties from bulk to thin films to nano materials, Confinement of electronin 0D,1D,2D and 3D systems, Synthesis of Nano materials: Bottom-Up approach: Chemical Routes for Synthesis of nano materials- Sol-gel, Precipitation, Solution Combustion synthesis,Hydrothermal,Top-Down approach- Ball milling technique, Sputtering, LaserAblation.

UNIT II:

Characterization of Nano materials

Basic principles and instrumentations of Electron Microscopy –Transmission Electron Microscope, Scanning Electron Microscope, Scanning Probes- Scanning Tunneling microscope, Atomic Force Microscope –different imaging modes, comparison of SEM and TEM, AFM and STM, AFM and SEM.

UNIT III:

Carbon Based Materials

Introduction, Synthesis, Properties (electrical, Electronic and Mechanical), and Applications of Graphene, SWCNT, MWCNT, Fullerenes and other Carbon Materials: Carbon nano composites, nano fibers,nano discs, nano diamonds.

UNIT IV:

Nano technology in Energy storage and conversion

Solar cells: First generation, Second generation and third generation solar cells: Construction and working of Dye sensitized and Quantum dot sensitized solar cells.

Batteries: Nanotechnology in Lithiumion battery-working, Requirements of anodic and cathodic materials.

Fuel Cells: Introduction, construction, working of fuel cells and nanotechnology in hydrogen storage and protonex change membranes

UNIT V:

Applications of Nanotechnology

Nano tech Applications and Recent Break throughs: Introduction,Significant Impact of Nano technology and Nanomaterial, Electronic Applications (Nano electronics), Computing Applications (Nano computers), Chemical Applications (Nano chemistry), Optical Applications (Nano photonics).

Text Books

1.Nano Materials–A.K.Bandyopadhyay/NewAgePublishers
2.Nano crystals: Synthesis, Properties and Applications – C.N.R. Rao, P. John Thomas and G. U. Kulkarni, Springer Series in Materials Science
3.Nano Essentials-T.Pradeep/TMH

References

1. Introduction to Nanotechnology,C.P.PooleandF.J.Owens,Wiley,2003
2. Understanding Nanotechnology,Scientific American2002
3. Nanotechnology, M.Ratner and D.Ratner,Prentice Hall2003

Outcomes:

1. Demonstrate the synthesis of nano particles by various techniques.
2. Explain working of basic instruments used in characterization of nano particles.
3. Discuss the application of nano technology to mechanical and civil domains
4. Classify the nanomaterials based on the dimensions.
5. Assess the suitability of nano materials for various device applications.

PROFESSIONAL ELECTIVE-II

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-II

(R22A0215)HIGH VOLTAGE ENGINEERING

COURSE OBJECTIVES:

To understand:

- The detailed analysis of Breakdown in gaseous, liquids and soliddielectrics.
- Information about generation and measurement of High voltage and current.
- High voltage testing methods.

UNIT – I

INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS:

Electric Field Stresses, Gas/ Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT – II

BREAK DOWN IN GASEOUS, LIQUID DIELECTRICS AND SOLID DIELECTRICS: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT – III

GENERATION OF HIGH VOLTAGES AND CURRENTS:

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS: Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT – IV

OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION:

Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT – V

NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS:

Testing of Insulators and bushings, testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters and Radio Interference measurements.

TEXT BOOKS:

1. M. S. Naidu, V. Kamaraju (2009), High Voltage Engineering, 4th edition, Tata McGraw Hill Publications, New Delhi.
2. E. Kuffel, W. S. Zaengl, J. Kuffel (2000), High Voltage Engineering: Fundamentals, 2nd edition, Elsevier Publishers, New York, USA.

REFERENCE BOOKS:

1. C. L. Wadhwa (2007), High Voltage Engineering, New Age Internationals (P) Limited, New Delhi.
2. Ravindra Arora Wolfgang Mosch (2011), High Voltage Insulation Engineering, 1st edition,New Age International (P) Ltd., New Delhi.

COURSE OUTCOMES:

After completing this course, the student must demonstrate the knowledge and ability to:

- Explain the techniques for high voltage generation
- Measure high voltage in power systems and describe the electrostatic fields and its control, design insulators for high voltage applications,
- Capable to perform non-destructive insulation test techniques
- Describe the over-voltages, testing procedures and insulation coordination, learn how to design and do testing of external insulation

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. TECH - II- SEM **L/T/P/C**
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PROFESSIONAL ELECTIVE-II
(R22A0216)POWER SEMICONDUCTOR DRIVES

Prerequisite: Electrical Machines I, Electrical Machines II, Power Electronics

COURSE OBJECTIVES:

- To learn the various methods of speed control of DC Motors using single and three phase thyristor converters.
- To understand the concept of four quadrant operation of DC Motors with single and dual fully controlled converters.
- To study the methods of speed control of DC Motors by DC choppers.
- To learn the various methods of speed control of Induction Motors from both Stator and Rotor side
- To study and understand the various Synchronous motor speed control methods with CSI, VSI, Cyclo converter etc. in both open loop and closed loop operation.

UNIT – I

CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS:

Introduction to thyrist or controlled Drives, Single Phase half and fully controlled converters connected to D.C separately excited and D.C series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics – Numerical Problems. CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS:

Three phase half and fully controlled converters connected to D.C separately excited and D.C series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Numerical Problems.

UNIT-II

FOUR QUADRANT OPERATION OF DC DRIVES:

Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT – III

CONTROL OF DC MOTORS BY CHOPPERS:

Single quadrant, two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed D.C Motors – Closed Loop operation (Block Diagram Only)

UNIT-IV

CONTROL OF INDUCTION MOTOR:

Variable voltage characteristics: - Control of Induction Motor by AC Voltage Controllers – Waveforms speed torque characteristics.

Variable frequency characteristics-

Variable frequency control of induction motor by Voltage source and current source inverter and Cyclo converter- PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance– Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –V

CONTROL OF SYNCHRONOUS MOTORS:

Separate control & self - control of synchronous motors – Operation of self-controlled synchronous motors by VSI and CSI – Operation –Closed Loop control operation of synchronous motor drives (Block Diagram Only).

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Electronic Circuits, Devices and applications by M.H. Rashid, PHI.

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. Modern Power Electronics and AC Drives by B.K. Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications.
4. A First course on Electrical Drives – S K Pillai New Age International (P) Ltd. 2ndEditon.

COURSE OUTCOMES:

At the end of the course the student would be able to:

1. Select an appropriate electric drive system based on their applications.
2. Explain the operation ofsingle and multi-quadrant electric drives of different types with both Single and Dual fully controlled converters.
3. Analyze the performance ofsingle phase & three phase rectifier fed as well as chopper fed DC motors.
4. Study and decide upon an appropriate speed control method for Induction Motors from amongst several methods studied, based on the application.
5. Explain clearly the speed control of Synchronous motors in both open and closed loop operation with CSI, VSI and cycloconverter based drives.

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PROFESSIONAL ELECTIVE-II

(R22A0217)POWER SYSTEM RELIABILITY

COURSE OBJECTIVES:

To study and understand:

- Concepts of probability theory
- Systems Model ling and Evaluation of Reliability with different methods
- Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes
- Concepts of multi-Component & Approximate System Reliability Evaluation

UNIT-I

BASIC PROBABILITY THEORY:

Basic concepts – Rules for combining Probabilities of events – Failure Density and Distribution functions – Bernoulli's trials – Binomial distribution – Expected value and standard deviation for binomial distribution – Examples.

UNIT-II

NETWORK MODELING AND RELIABILITY EVALUATION:

Basic concepts – Evaluation of network Reliability / Unreliability – Series systems, Parallel systems, Series - Parallel systems, partially redundant systems – Types of redundancies - Evaluation of network Reliability / Unreliability using conditional probability method – Paths based and Cut set-based approach – complete event tree and reduced event tree methods -Examples.

UNIT-III

TIME DEPENDENT PROBABILITY:

Basic concepts – Reliability functions f(t), F(t), R(t), h(t) – Relationship between these functions – Baths tubs curve – Exponential failure density and distribution functions - Expected value and standard deviation of Exponential distribution – Measures of reliability – MTTF, MTTR, MTBF – Evaluation of network reliability / Unreliability of simple Series, Parallel, Series-Parallel systems - Partially redundant systems - Evaluation of reliability measure – MTTF for series and parallel systems –Examples.

UNIT-IV

DISCRETE MARKOV CHAINS & CONTINUOUS MARKOV PROCESSES:

Basic concepts – Stochastic transitional Probability matrix – time dependent probability evaluation – Limiting State Probability evaluation – Absorbing states – Markov Processes- Model ling concepts – State space diagrams – time dependent reliability evaluation of single component repairable model – Evaluation of Limiting State Probabilities of one, two component repairable models – Frequency and duration concepts – Frequency balance approach - Examples.

UNIT-V

MULTI COMPONENT & APPROXIMATE SYSTEM RELIABILITY EVALUATION:

Recursive relation for evaluation of equivalent transitional rates, cumulative probability and cumulative frequency and 'n' component repairable model - Series systems, Parallel systems, Basic reliability indices – Cut set approach – Examples.

TEXT BOOK:

1. System Reliability Concepts by V. Sankar, Himalaya Publishing House, 2015.

REFERENCE BOOKS:

1. Reliability Evaluation of Engineering Systems by Roy Billinton and Ronald N. Allan, Reprinted in India B. S. Publications, 2007.
2. Reliability Engineering by E. Balagurusamy, Tata McGraw Hill, 2003.
3. Reliability and Maintainability Engineering by Charles E. Ebeling, Tata McGraw Hill, 2000.
4. Probability concepts in Electric Power system – G.J. Anders- 1st edition –1990 – John Wiley & sons.

COURSE OUTCOMES:

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

- Apply the Concepts of probability theory for Systems Modelling and Evaluation of Reliability in different methods
- Apply the Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes in establishing the reliability figure of practical systems
- Carry out multi-Component & Approximate System Reliability Evaluation

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(R22A0289)POWER SYSTEM LABORATORY

COURSE OBJECTIVES:

- To perform testing of CT, PT's and Insulator strings.
- To find the characteristics of relays.
- To perform analysis on Transmission line models and Generators.

Among the following experiments any 10 are to be conducted:

1. Characteristics of IDMT over Current Relay.
2. Differential protection of 1-Φ transformer.
3. Characteristics of Micro Processor based Over Voltage.
4. Testing of CT, PT's and Insulator string.
5. ABCD constants and Regulation of a 3-Φ transmission line model.
6. Power circle diagrams of a 3-Φ transmission line model.
7. LG, LL and 3-Φ fault analysis of 3-Φ synchronous machine.
8. Formation of YBUS using MATLAB.
9. Formation of ZBUS using MATLAB.
10. Load Flow Analysis using Gauss Seidal (GS) Method using MATLAB.
11. Load Flow Analysis using Newton's Raphson (NR) Method using MATLAB.
12. Load Flow Analysis using Fast Decoupled (FD) Method using MATLAB.
13. Transient Stability Analysis for Single Machine connected to Infinite Bus by Point-by-Point method using MATLAB.

COURSE OUTCOMES:

After completion of this lab, the student will be able to

- Perform various load flow techniques
- Understand Different protection methods
- Analyze the experimental data and draw the conclusions.

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(R20A0488) MICROPROCESSORS & MICROCONTROLLERS LAB

Note: - Minimum of 10 experiments has to be conducted

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16-bit arithmetic operations using 8086 (using Various Addressing Modes).
2. Program for sorting an array using 8086.
3. Program for searching a number or character in a string using 8086.
4. Program for string manipulations using 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify Interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

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DIGITAL SIGNAL PROCESSING LABORATORY

Pre-requisites: Digital Signal Processing

Course Objectives:

- To implement Linear and Circular Convolution.
- To implement FIR and IIR filter and architecture of DSP processor.
- To demonstrate Finite word length effect.

Course Outcomes:

At the end of this course, students will be able to:

- Carry out simulation of DSP system and abilities towards DSP processor-based implementation of DSP systems.
- Analyze Finite word length effect on DSP systems and applications of FFT to DSP.
- Implement adaptive filters for various applications of DSP.

List of Experiments (programs):

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
2. To find DFT / IDFT of given DT Signal
3. To find Frequency Response of a given System given in Transfer Function/ Differential equation form.
4. Implementation of FFT of given Sequence
5. Determination of Power Spectrum of a given Signal(s).
6. Implementation of LP FIR Filter for a given Sequence/Signal.
7. Implementation of HP FIR Filter for a given Sequence/Signal
8. Implementation of LP IIR Filter for a given Sequence/Signal
9. Implementation of HP IIR Filter for a given Sequence/Signal
10. Generation of Sinusoidal Signal through Filtering
11. Generation of DTMF Signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D Sampling Rate Converters
15. 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.
16. Noise Removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
17. Impulse Response of First order and Second Order Systems. (The above Programs shall be implemented in Software (Using MATLAB / Lab View / C Programming/ Equivalent) and Hardware (Using TI / Analog Devices / Motorola / Equivalent DSP processors) Note: - Minimum of 12 experiments has to be conducted.

LIST OF MAJOR EQUIPMENTS & SOFTWARE

- MATLAB with Simulink
- TMS 320C50 DSP Processors (Kit& Add-on Cards)
- Signal Processing Tool Box
- Function Generators (1MHz)
- Cathode Ray Oscilloscope (30MHz)

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.

REFERENCE BOOKS:

1. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009
2. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
3. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
4. Digital Signal Processing - A Practical approach, Emmanuel C. If each orand Barrie W. Jervis,2nd Edition, Pearson Education, 2009

ONLINE RESOURCES:

1. NPTEL DSP Course: Lectures, notes, and lab assignments for DSP (NPTEL DSP Course)
2. DSP Course on edX: Video lectures, lab assignments, and quizzes (DSP Course on edX)
3. https://sjce.ac.in/wp-content/uploads/2021/11/dsp-lab-manual-2021-22.pdf

IV-I

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. TECH - I- SEM **L/T/P/C**

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(R22A0218)POWER ELECTRONIC APPLICATIONS TO RENEWABLE ENERGY SYSTEM

Prerequisite: Power Electronics, Renewable Energy Sources

Course Objectives:

- To impart knowledge on different types of renewable energy systems.
- To analyze the operation of electrical generators used for the wind energy conversion Systems.
- To know the operation of power converters and PV systems operation.

Course Outcomes:

At the end of this course, students will be able to:

- Proficiently demonstrate various renewable energy technologies utilized for electrical power generation.
- Analyze the operating principles of different types of wind generators and identify suitable converters (AC-DC, DC-DC, AC-AC) for renewable energy systems.
- Interpret and analyze various wind and photovoltaic (PV) systems, including stand-alone, grid connected, and hybrid configurations, showcasing a comprehensive understanding of renewable energy applications.

UNIT- I:

Solar cell characteristics and their measurement, PV Module, PV array, Partial shading of a solar cell and a module, the diode, Power conditioning unit, maximum power point tracker, Implementation of Perturb and Observe Method, Incremental Conductance Method, Battery charger/discharge controller.

UNIT- II:

Centralized Inverters, String Inverters, Multi-string Inverters, Module Integrated Inverter/Micro-inverters, Inverter Topology, Model of Inverter, Sizing Batteries and Inverters for a Solar PV System. Types of PV Systems: Grid-Connected Solar PV System, Stand-Alone Solar PV System.

UNIT- III:

Introduction to wind:

Characteristics, Wind Turbine, Fixed and Variable-Speed Wind Turbines, Components of WECS, Description of Components, Types of Wind Turbine Generators, Economics of Wind Energy Conversion Systems, Linking Wind Turbines onto the Grid, Power Converter Topologies for Wind Turbine Generators.

UNIT- IV:

Modeling of Permanent Magnet Synchronous Generators, Doubly Fed Induction Generators, Squirrel cage Induction Generators wind turbine, Control of Power converters for WECS.

UNIT - V:

Hybrid Energy Systems, Need for Hybrid Energy Systems, Range and types of Hybrid systems, Hybrid Solar PV/Wind Energy System, Architecture of Solar-Wind Hybrid System and Grid connected issues.

TEXTBOOKS:

1. S. N. Bhadra, D. Kastha, S. Banerjee, “Wind Electrical Systems”, Oxford University Press, 2005.
2. S. N. Bhadra, D. Kastha, & S. Banerjee “Wind Electrical Systems”, Oxford University Press, 2009.
3. Rashid. M. H, “Power Electronics Hand book”, Academic Press, 2001.

REFERENCE BOOKS:

1. Rai. G. D, “Non-conventional energy sources”, Khanna Publishers, 1993.
2. Rai. G.D,” Solar energy utilization”, Khanna Publishes, 1993.
3. Gray, L. Johnson, “Wind energy system”, Prentice Hall of India, 1995.
4. B.H.Khan "Non-conventional Energy sources", Mc Graw-hill, 2nd Edition, 2009

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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3/0/0/3

(R22A0219)POWER SYSTEM OPERATION AND CONTROL

COURSE OBJECTIVES:

- To understand real power control and operation
- To know the importance of frequency control
- To analyze different methods to control reactive power
- To understand unit commitment problem and importance of economic load dispatch

UNIT – I:

ECONOMIC OPERATION OF POWER SYSTEMS:

Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected. Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

UNIT – II:

UNIT COMMITMENT & POWER SYSTEM STABILITY:

Unit Commitment:

Statement of Unit Commitment problem – constraints; spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints. Solution methods - forward dynamic programming approach.

Power System Stability:

Introduction, power angle equation, steady state stability, transient stability and swing equation. Equal area criterion of stability – applications of equal area criterion, step by step solution of swing equation – factors effecting transient stability.

UNIT –III

MODELLING OF TURBINE, GENERATOR AND AUTOMATIC CONTROLLERS:

Modelling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbine. Modelling of Governor: Mathematical Modelling of Speed Governing System – Derivation of small signal transfer function. Modelling of generator load model, modelling of power systems

UNIT – IV

AUTOMATIC LOAD FREQUENCY CONTROL:

Necessity of keeping frequency constant. Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case. Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control. Proportional plus Integral control of single area and its block diagram representation, steady state response.

UNIT – V:

REACTIVE POWER AND VOLTAGE CONTROL:

Overview of Reactive Power control – Reactive Power compensation in transmission systems - advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt, Series and synchronous

Compensation, Receiving end power circle diagrams. Methods of voltage control – Tap changing transformer. Tap setting of OLTC transformer.

TEXT BOOKS:

1. C.L.Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Publishing Co., 2001.
2. D.P.Kothari and I.J.Nagrath, Modern Power System Analysis, 4th Edn, Tata McGraw Hill Education Private Limited2011.

REFERENCEBOOKS:

1. P. Kothari: Modern Power System Analysis-Tata McGraw Hill Pub. Co. 2003
2. HadiScadat: Power System Analysis – Tata McGraw Hill Pub. Co.2002
3. W.D. Stevenson: Elements of Power system Analysis – McGraw Hill International Student Edition.

COURSE OUTCOMES:

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

- Analyze the optimal scheduling of power plants
- Analyze the steady state behavior of the power system for voltage and frequency fluctuations
- Describe reactive power control of a power system
- Design suitable controller to dampen the frequency and voltage steady state oscillations

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(R22A0226)WIND AND SOLAR ENERGY SYSTEM

Prerequisite: Renewable Energy Systems

Course Objectives:

- To study the physics of wind power and energy, understanding the principles governing wind generator operation.
- To gain knowledge about solar power resources, analyze solar photovoltaic cells, and discuss solar thermal power generation.
- To identify and understand network integration issues associated with renewable energy sources like wind and solar power.

Course Outcomes:

At the end of this course, students will be able to:

- Understand the energy scenario and the consequent growths of the power generate renewable energy sources.
- Understand the basic physics of wind and solar power generation.
- Understand the power electronic interfaces for wind and solar generation and grid-integration issues.

UNIT-I:

Physics Of Wind Power:

History of wind power, Indian and Global statistics, Wind physics, Betz limit ratio, stall and pitch control, Wind speed statistics-probability distributions, and Wind power-cumulative distribution functions.

UNIT-II:

Wind Generator Topologies:

Review of modern wind turbine technologies, Fixed and Variable speed wind turbine, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent Magnet Synchronous Generators, Power electronics converters. Generator configurations, Converter Control.

UNIT-III:

The Solar Resource:

Introduction, solar radiation spectra, solar geometry, Earth Sun angles, observer Sun angles, solar day length, Estimation of solar energy availability.

Solar Photovoltaic:

Technologies-Amorphous, mono-crystalline, polycrystalline; V-I characteristics of a PV cell, PV module, array, Power Electronic Converters for Solar Systems, Maximum Power point Tracking (MPPT) algorithms. Converter Control

UNIT-IV:

Network Integration Issues:

Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind farm behavior during grid disturbances. Power quality issues. Power system interconnection experiences in the world. Hybrid and isolated operations of solar PV and wind systems.

UNIT-V:

Solar Thermal Power Generation:
Technologies, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, elementary analysis.

TEXT BOOKS:
1. T. Ackermann, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
2. G. M. Masters, "Renewable and Efficient Electric Power Systems", John Wiley and Sons, 2004.

REFERENCE BOOKS:
1. S. P. Sukhatme, "Solar Energy: Principles of Thermal Collection and Storage", McGraw Hill, 1984.
2. H. Siegfried and R. Waddington, "Grid integration of wind energy conversion systems" John Wiley and Sons Ltd., 2006.
3. G. N. Tiwari and M. K. Ghosal, "Renewable Energy Applications", Narosa Publications, 2004.
4. J. A. Duffie and W. A. Beckman, "Solar Engineering of Thermal Processes", John Wiley & Sons, 1991.

PROFESSIONAL ELECTIVE-III

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-III

(R20A0220)MOBILE APPLICATION DEVELOPMENT

Prerequisites

1. Acquaintance with JAVA programming
2. A Course on DBMS

Course Objectives

- To demonstrate their understanding of the fundamentals of Android operating systems
- To improves their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

Course Outcomes

- Understand the working of Android OS Practically.
- Develop Android user interfaces
- Develop, deploy and maintain the Android Applications.

UNIT - I

Introduction to Android Operating System:

Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT - II

Android User Interface:

Measurements – Device and pixel density independent measuring unit - s Layouts – Linear, Relative, Grid and Table Layouts User Interface (UI) Components –Editable and non-editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT - III

Intents and Broadcasts:

Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT - IV

Persistent Storage:
Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

UNIT – V
Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

TEXT BOOK:
1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012.

REFERENCE BOOKS:
1. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013.
2. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013.

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IV Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-III

(R22A0221)AUTOMATION WITH PLC

COURSE OBJECTIVES:

For programmable logic controllers & embedded systems, the course will enable the students

1) To provide and ensure a comprehensive understanding of using advanced controllers in measurement and control instrumentation.
2) To analyze Programmable Logic Controller (PLC), IO Modules and internal features, Programming in Ladder Logic.
3) Understand the core of an embedded system
4) To learn the design process of embedded system applications.
5) To understands the RTOS and inter-process communication.
6) 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.

UNIT-II:

TYPICAL EMBEDDED SYSTEM:

Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTS; Memory-ROM, RAM, memory selection for embedded systems; Sensors andactuators, Onboard communication interfaces-I2C, SPI.

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT:

Embedded firmware design approaches- super loop-based approach, operating system-based approach; embedded firmware development languages-assemblylanguage-based development, high level language-based development.

UNIT-III:

RTOS BASED EMBEDDED SYSTEM DESIGN:

Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling, how to choose an RTOS.

UNIT-IV:

PLC BASICS:

PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules. PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

UNIT-V:

LADDER DIAGRAMS FOR PROCESS CONTROL:

Ladder diagrams and sequence listings, ladderdiagram construction and flowchart for spray process system.

PLC REGISTERS:

Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

TEXT BOOKS:

1. Programmable Logic Controllers- Principles and Applications by John W. Webb and Ronald A.Reiss, Fifth Edition, PHI.

2. Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).

3. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Programmable Logic Controllers- Programming Method and Applications by JR. Hackworth and F.D Hackworth Jr., Pearson, 2004.

2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.

COURSE OUTCOMES:

After going through this course, the student will be able to

- Describe the main functional units in a PLC and be able to explain how they interact
- Develop ladder logic programming for simple process.
- Understand and design the embedded systems
- Understand Embedded Firmware design approaches
- Learn the basics of RTOS

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IV Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-III

(R22A0222)ELECTRIC AND HYBRID VEHICLES

COURSE OBJECTIVES:

- To understand the models, describe hybrid vehicles and their performance.
- To understand the different possible ways of energy storage.
- To understand the different strategies related to hybrid vehicle operation & energy management.

UNIT 1:

INTRODUCTION:

Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, and mathematical models to describe vehicle performance.

UNIT 2:

INTRODUCTION TO HYBRID ELECTRIC VEHICLES:

History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

UNIT 3:

ELECTRIC TRAINS:

Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis. Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

UNIT 4:

ENERGY STORAGE:

Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems

UNIT 5:

ENERGY MANAGEMENT STRATEGIES:

Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies and implementation issues of energy management strategies.

TEXT BOOKS:

1. C. Mi, M. A. Masrur and D. W. Gao, "Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives", John Wiley & Sons, 2011.
2. S. Onori, L. Serrao and G. Rizzoni, "Hybrid Electric Vehicles: Energy Management Strategies",Springer, 2015.

REFERENCE BOOKS:

1. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design", CRC Press, 2004.
2. T. Denton, "Electric and Hybrid Vehicles", Routledge, 2016

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

- Study the models to describe hybrid vehicles and their performance.
- Implement the different possible ways of energy storage.
- Adopt the different strategies related to hybrid vehicle operation & energy management.

PROFESSIONAL ELECTIVE-IV

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IV Year B. TECH - I- SEM **L/T/P/C**

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PROFESSIONAL ELECTIVE-IV

(R22A0223)HVDC TRANSMISSION

Prerequisite:

Power System-I, Power System-II, Power System Protection, Power System Operation and Control, Power Electronics

Course Objectives:

- To compare EHV AC and HVDC systems
- To analyze Graetz circuit and also explain 6 and 12 pulse converters
- To control HVDC systems with various methods and to perform power flow analysis in AC/DC systems
- To describe various protection methods for HVDC systems and Harmonics

UNIT- I

Basic Concepts

Necessity of HVDC systems, Economics and Terminal equipment of HVDC transmission systems, Types of HVDC Links, Apparatus required for HVDC Systems, Comparison of AC and DC Transmission, Application of DC Transmission System, Planning and Modern trends in D.C. Transmission.

Analysis of HVDC Converters:

Choice of Converter Configuration, Analysis of Graetz circuit, Characteristics of 6 Pulse and 12 Pulse converters, Cases of two 3 phase converters in Y/Y mode – their performance.

UNIT- II

Converter and HVDC System Control:

Principle of DC Link Control, Converters Control Characteristics, Firing angle control, Current and extinction angle control, Effect of source inductance on the system, Starting and stopping of DC link, Power Control.

Reactive Power Control in HVDC:

Introduction, Reactive Power Requirements in steady state, sources of reactive power- Static VAR Compensators, Reactive power control during transients.

UNIT- III

Power Flow Analysis in AC/DC Systems:

Modelling of DC Links, DC Network, DC Converter,Controller Equations, Solution of DC load flow, P.U. System for DC quantities, solution of ACDC Power flow-Simultaneous Method-Sequential method.

UNIT- IV

Converter Faults and Protection:

Converter faults, protection against over current and over voltage in converter station, surge arresters, smoothing reactors, DC breakers, Audible noise, space charge field, corona effects on DC lines, Radio interference.

UNIT-V:

Harmonics:

Generation of Harmonics, Characteristics harmonics, calculation of AC Harmonics, Non-Characteristics harmonics, adverse effects of harmonics, Calculation of voltage and Current harmonics, Effect of Pulse number on harmonics

Filters:

Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. "K. R. Padiyar", HVDC Power Transmission Systems: Technology and system Interactions, New Age International (P) Limited, and Publishers, 1990.
2."S K Kamakshaiah, V Kamaraju", HVDC Transmission, TMH Publishers, 2011

REFERENCE BOOKS:

1. "S. Rao", EHVAC and HVDC Transmission Engineering and Practice, Khanna publications, 3rd Edition 1999.
2. "Jos Arrillaga", HVDC Transmission, The institution of electrical engineers, IEE power & energy series 29, 2nd edition 1998.
3. "E. W. Kimbark", Direct Current Transmission, John Wiley and Sons, volume 1, 1971.
4. "E. Uhlmann", Power Transmission by Direct Current, B. S. Publications, 2009

Course Outcomes:

After completion of this course the student is able to

- Compare EHV AC and HVDC system and to describe various types of DC links
- Analyze Graetz circuit for rectifier and inverter mode of operation
- Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
- Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters

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PROFESSIONAL ELECTIVE-IV

(R22A0224)INDUSRIAL AND ALLIED ELECTRICAL SYSTEM

COURSE OBJECTIVES:

- To give a basic knowledge on residential, commercial and wiring systems.
- To understand the different applications like heating, welding and illumination.
- To gives a comprehensive idea on UPS, Electric Traction and industrial electrical systems.

UNIT - I

ILLUMINATION:

Introduction, terms used in illumination, laws of illumination, polar curves, photometry. Sources of light Discharge lamps: Mercury Vapor and Sodium Vapor lamps – comparison between tungsten filament lamps and fluorescent lamps. Basic principles of light control, Types and design of lighting and flood lighting.

UNIT - II

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS:

Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthing for commercial installations. Selection and sizing of components.

UNIT - III

ELECTRIC HEATING AND WELDING: Electric Heating:

Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating. Electric welding: resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT - IV

INDUSTRIAL ELECTRICAL SYSTEMS:

Industrial loads, motors, starting of motors, Lightning Protection, methods of earthing, UPS System, Electrical Systems for the elevators, Battery banks, Selection of UPS and Battery Banks.

UNIT - V

ELECTRIC TRACTION:

Traction Systems: types, overview of existing electric traction systems in India. Special features of traction motor. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves. Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. J.B. Gupta, “Utilization of Electric Power and Electric Traction”, Kataria & Sons publishers, Delhi, IX Edition, 2004.
2. C.L. Wadhwa, “Generation, Distribution and Utilization of electrical Energy”, New Age International (P) Limited Publishers, 3rd Edition, 2010
3. S. L. Uppal and G. C. Garg,” Electrical wiring Estimating & costing” Khanna publishers,2008

4. Utilization of electric Energy by E. Openshaw Taylor, Orient Longman Private Limited,1971.

REFERENCE BOOKS:

1. N.V. Suryanarayana, "Utilization of Electrical Power including Electric drives and Electric traction", New Age International (P) Limited Publishers, 1st Edition, 1994.
2. E. Open Shaw Taylor, "Utilization of Electric Energy", Orient Longman,1st Edition,1937

COURSE OUTCOMES:

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

- Maintain/Troubleshoot various lamps and fittings in use.
- Understand various types of Heating, Welding and traction system.
- Design Illumination systems for various applications.
- Work in the areas of UPS systems and traction systems production, commissioning and maintenance.

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PROFESSIONAL ELECTIVE-IV

(R22A0225)EMBEDDED SYSTEM APPLICATIONS

Prerequisite:

C Language, I/O, Analog and Digital interfacing, and peripherals.

Course Objectives:

- To equip with the basic concepts of embedded system, applications in which they are used,
- To describe tools and methodologies needed for embedded system design.
- To know RTOS concepts and familiar with the characteristics of latency in real-time systems.

Course Outcomes:

At the end of this course, students will be able to:

1. Understand the microprocessor architecture and its components used in embedded systems
2. Write the 8051-assembly language code and Embedded 'C' code for interfacing various devices.
3. Develop simple embedded systems for real time operations

UNIT-I:

Embedded Systems Basics:

Introduction to Embedded systems, Examples of embedded systems, Typical Hardware, Gates, Timing Diagrams, Memory, Microprocessors, Buses, Direct Memory Access, Interrupts, Microprocessor Architecture, and Interrupt Basics.

UNIT-II:

The 8051 Architecture:

Introduction, 8051 Micro controller Hardware, Input/output Pin Ports and Circuits, External Memory, Serial data Input/output, Interrupts.

UNIT-III:

Embedded C Programming:

Overview of the C standard library, Embedded System Oriented Topics, MISRA C — Designing Safer C Programs, Basics of event driven programming.

Basic Assembly Language Programming Concepts:

The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051.

UNIT-IV:

Moving Data:

Introduction, Addressing Modes, External Data Moves, Code Memory ReadOnly Data Moves, Push and Pop Opcodes, Data Exchanges.

Basic Design Using a Real-Time Operating System:

Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment

UNIT-V:

Applications:

Introduction, keyboards, Human Factor, Key Switch Factors, Keyboard Configurations, Displays, Seven-Segment Numeric Display, D/A and A/D Conversions.

Embedded Software Development Tools:

Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

TEXT BOOKS:

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

REFERENCE BOOKS:

1. Embedded Microcomputer Systems Real Time Interfacing, Jonathan W.Valvano, Cengage Learning.
2. 8051 Microcontrollers, Satish Shah, Oxford Higher Education.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education. a. http://nptel.ac.in/courses.php b.http://jntukcoeerd.in/

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IV Year B. TECH - I- SEM **L/T/P/C**

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(R22A0290)SIMULATION OF RENEWABLE ENERGY SYSTEM LABORATORY

Prerequisite: Renewable Energy Systems, Power Electronics

Course Objectives:

- Develop proficiency in modeling the steady-state and dynamic characteristics of photovoltaic (PV), fuel cell, and wind energy sources.
- Understand and analyze power converter topologies for stand-alone and grid-connected PV, fuel cell, and wind energy systems.
- Explore advanced topics in power electronics, including maximum power point tracking, power factor correction, switched capacitor DC-DC converters, ZVS/ZCS configurations, compensation schemes, and new power converter topologies.

Course Outcomes:

At the end of this course, students will be able to:

- Demonstrate the ability to model and analyze the steady-state and dynamic characteristics of PV, fuel cell, and wind energy sources
- Apply knowledge to understand, design, and analyze power converter topologies for both stand-alone and grid-connected PV, fuel cell, and wind energy systems.
- Acquire advanced expertise in power electronics, covering topics such as maximum power point tracking, power factor correction, switched capacitor converters, ZVS/ZCS configurations, compensation schemes, and new power converter topologies.

List of experiments:

1. Modelling the steady state and dynamic characteristics of the following
   (i) PV,
   (ii) Fuel cell and
   (iii) Wind energy sources
2. Power converter topologies for stand –alone and grid connected
   (i) PV,
   (ii) Fuel cell and
   (iii) Wind energy sources
3. Maximum Power Point Tracking Schemes
4. Power factor correction techniques for AC to DC systems
5. Switched capacitor DC – DC power converters
6. ZVS, ZCS configurations
7. Compensation Schemes for VAR, harmonics and phase imbalance Power conversion and Electric Drives
8. New power converter topologies and their analysis, modelling and simulation
9. High frequency link power conversion
10. Radiation effects on power electronic systems and components EMI/EMC
11. Analysis, measurement and mitigation of EMI in Electronic and power electronic systems
12. Microgrid Power Quality

***Note:** Perform the simulation of the above list of experiments with MATLAB/any Simulation software

TEXTBOOKS:

1. S. N. Bhadra, D.Kastha, S.Banerjee, “Wind Electrical Systems”, Oxford University Press, 2005.
2. S.N.Bhadra, D. Kastha, & S. Banerjee “Wind Electrical Systems”, Oxford University Press, 2009.
3. Rashid.M. H, “Power Electronics Hand book”, Academic Press, 2001.

REFERENCE BOOKS:

1. Rai. G.D, “Non-conventional energy sources”, Khanna Publishers, 1993.
2. Rai. G.D,” Solar energy utilization”, Khanna Publishes, 1993.
3. Gray, L. Johnson, “Wind energy system”, Prentice Hall of India, 1995.
4. B.H.Khan "Non-conventional Energy sources", Mc Graw-hill, 2nd Edition, 2009

IV-II

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. TECH - II- SEM **L/T/P/C**

4/0/0/4

INNOVATION,STARTUP&ENTREPRENEURSHIP

COURSE OBJECTIVES:

1. To understand the concept of innovation, new product development
2. To know the startup opportunities and startup equation
3. To understand new venture creation opportunities, its resources, and Requirements
4. To understand the Entrepreneurial Mindset and new trends in entrepreneurship
5. To understand the strategic perspectives in entrepreneurship

UNIT-I

Innovation Management:

Concept of Innovation- Levels of Innovation- Incremental Vs Radical Innovation-Inbound and Outbound Ideation- Open and Other Innovative Ideation Methods-Theories of outsourcing New Product Development: Transaction Cost, Resource Based, Resource Dependence, Knowledge Based Theories.

UNIT-II

Startup opportunities:

The New Industrial Revolution – The Big Idea- Generate Ideas with Brainstorming Business Startup - Ideation- Venture Choices - The Rise of the startup economy -The Six Forces of Change- The Startup Equation

UNIT-III

Startup Capital Requirements and Legal Environment:

Identifying Startup capital Resource Requirements - estimating Startup cash requirements - Develop financial assumptions-Constructing a Process Map - Positioning the venture in the value chain - Launch strategy to reduce risks- Startup financing metrics – **Business plan**-The Legal Environment- Approval for New Ventures- Taxes or duties payable for new ventures.

UNIT-IV

Understanding Entrepreneurial Mindset-

The revolution impact of entrepreneurship- The evolution of entrepreneurship - Functions of Entrepreneurs – types of entrepreneurs -Approaches to entrepreneurship- Process approach- Role of entrepreneurship in economic development-Twenty first century trends in entrepreneurship.

UNIT-V

Strategic perspectives in entrepreneurship –

Strategic planning - Strategic actions strategic positioning- Business stabilization - Building the adaptive firms - Understanding the growth stage – Internal growth strategies and external growth strategies, Unique managerial concern of growing ventures. Initiatives by the Government of India to promote entrepreneurship, Social and women entrepreneurship.

TEXT BOOKS:

1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, Cengage Learning, 2016 Anjan Raichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International, 2010.
2. Innovation Management, C.S.G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010.

REFERENCE BOOKS

1. S. R. Bhowmik & M. Bhowmik, Entrepreneurship, New Age International, 2007.
2. Stuart Read, Effectual Entrepreneurship, Routledge, 2013
3. Rajeev Roy, Entrepreneurship, 2e, Oxford publications, 2012.
4. Nandan .H, Fundamentals of Entrepreneurship, PHI, 2013

COURSE OUTCOMES:

- Students will be able to understand the concept of innovation and new product development; startup opportunities and startup equation;
- new venture creation opportunities, its resources, and Requirements;
- the Entrepreneurial Mindset and new trends in entrepreneurship;
- strategic perspectives in entrepreneurship

PROFESSIONAL ELECTIVE -V

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. TECH - II- SEM **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE-V

(R22A0227)POWER QUALITY & FACTS

COURSE OBJECTIVES:

To study

- The various power quality issues in Distribution systems.
- The objectives of Shunt and Series Reactive Power compensation.
- The importance of controllable parameters and types of FACTS controllers & their benefits.
- STATCOM & SVC and their comparison. Regulation of STATCOM, Functioning and control ofGCSC, TSSC and TCSC.

UNIT-I

POWER QUALITY PROBLEMS IN DISTRIBUTION SYSTEMS:

Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions.

Wave-form Distortions:

Harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement.

UNIT-II

TRANSMISSION LINES AND SERIES/SHUNT REACTIVE POWER COMPENSATION:

Basics of AC Transmission. Analysis of uncompensated AC transmission lines. Passive Reactive Power Compensation. Shunt and series compensation at the mid-point of an AC line. Comparison of Series and Shunt Compensation.

UNIT-III

STATIC SHUNT COMPENSATORS:

Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR Compensator-its characteristics, TCR, TSC, FC-TCR configurations, STATCOM -basic operating principle, control approaches and characteristics.

UNIT-IV

STATIC SERIES COMPENSATORS:

Objectives of series compensator, variable impedance type of series compensators, TCSC, TSSC-Operating principles and control schemes, SSSC, Power Angle characteristics, Control range and VAR rating, Capability to provide reactive power compensation, external control.

UNIT-V

COMBINED COMPENSATORS:

Introduction to Unified Power Flow Controller, Basic operating principles, Conventional control Capabilities, Independent control of real and reactive power.

TEXT BOOKS:

1. Electrical Power Systems Quality, Dugan Roger C. Santoso Surya, Mc Granaghan, Marks F. Beaty and H. Wayre, Mc Graw Hill.
2. Power Systems Quality Assessment, J. Arillaga, N.R. Watson, S. Clon, John Wiley.
3. “Understanding FACTS –Concepts and Technology of Flexible AC Transmission Systems”Narain

G. Hingorani, Laszlo Gyugyi.

REFERENCE BOOKS:

1. Power Quality, C. Sankaran, CRC Press 4. Understanding power quality problems, Math H. Bollen,IEEE press.
2. A.T. John, "Flexible AC Transmission System", Institution of Electrical and Electronic Engineers (IEEE), 1999.

COURSE OUTCOMES:

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

- Know the severity of power quality problems in distribution system and understand the concept of voltage sag transformation from up-stream (higher voltages) to downstream (lower voltage).
- Understand the Concept of improving the power quality to sensitive load by various mitigating custom power devices.
- Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping.
- Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC.

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IV Year B. TECH - II- SEM **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE-V

(R22A0228)SOLAR POWER BATTERIES

Prerequisite: Renewable Energy Sources, Energy Storage Systems

Course Objectives:

To understand the PV systems and the solar power batteries operation

- To analyze the solar PV system storage with batteries.
- To understand Grid Tie vs. Off-Grid Solar Battery System

Course Outcomes:

At the end of this course, students will be able to:

Know operating principes of different types of solar power batteries

- Use the batteries for effective storage of solar PV.
- Gain the knowledge on environmental impacts of solar power batteries.

UNIT-I:

Introduction to solar PV systems, basics of Storage for solar PV systems, Storage for solar PV systems: the batteries, Introduction to Solar Power Batteries, terminology associated, understanding Solar Battery Specifications, working principle, Series Vs. Parallel, Charging parameters, cycle life, Temperature effects, Battery Design and Construction, Important components in battery construction.

UNIT-II:

Primary and Secondary batteries, Classification of Secondary batteries, i.e Lead-Acid, Lead-Antimony, Lead-Calcium, Lead-Acid Battery Chemistry, Nickel-Cadmium Batteries and their types.

UNIT-III:

AC Coupled Storage vs. DC Coupled Storage, working of Solar Batteries with a Solar Power System and Hybrid Inverter, Main Degradation mechanisms of Solar Batteries, Battery Strengths and Weaknesses, Battery System Design and Selection Criteria, Life Expectancy, Battery standards, Safety precautions,

UNIT-IV:

Solar Battery Costs, Declining Cost, factors contribute to the performance of solar battery, selection of suitable batteries based on the application, Grid Tie vs. Off-Grid Solar Battery System, Benefits and disadvantages of using solar batteries,

UNIT-V:

The environmental impacts of batteries: Introduction, Service life of the components, Energy requirements for production and transport of the PV-battery system components, Contributing components, Influence of different user conditions, Uncertainties, Future research, Energy return factor, The overall battery efficiency, Different efficiency measures and battery design, The Future of Solar Battery Storage.

TEXT BOOKS:

1. S. Sumathi and L. Ashok Kumar, Solar PV and Wind Energy Conversion Systems: An Introduction to Theory, Modeling with MATLAB/SIMULINK, and the Role of Soft Computing Techniques, Springer 2011

2. H.A. Kiehne, "Battery Technology Handbook" by Publisher: CRC Press 2003
3. https://core.ac.uk/download/pdf/30044842.pdf
4. Handbook on Battery Energy Storage System
5. https://www.adb.org/sites/default/files/publication/479891/handbook-battery-energy-storage-system.pdf

REFERENCE BOOKS:

1. Cristina Archer and S. Lovejoy, Battery Technology for Electric Vehicles: Public Science and Private Innovation, Springer 2015
2. Soteris A. Kalogirou, "Solar Energy Engineering: Processes and Systems" by, Academic Press, Year: 2009
3. https://files.bregroup.com/bre-co-uk-file-librarycopy/filelibrary/nsc/Documents%20Library/NSC%20Publications/88031-BRE_Solar-ConsumerGuide-A4-12pp.pdf
4. https://www.sunwize.com/tech-notes/solar-battery-basics/
5. https://palmetto.com/learning-center/blog/how-does-a-solar-battery-work
6. https://www.letsgosolar.com/faq/what-is-a-solar-battery/
7. https://www.purevolt.ie/domestic-solar/equipment/solar-storage-batteries.php

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IV Year B. TECH - II- SEM **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE-V

(R22A0229)AI TECHNIQUES IN ELECTRICAL ENGENEERING

Pre-requisites: Power Systems Operation and Control

Course Objectives:

To locate soft commanding methodologies, such as artificial neural networks, Fuzzy logic and genetic Algorithms.

To observe the concepts of FFN and concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy control

To analyze genetic algorithm, genetic operations and genetic mutation

Course Outcomes:

At the end of this course, students will be able to:

Understand feed forward neural networks, feedback neural networks and learning techniques.

- Understand fuzziness involved in various systems and fuzzy set theory.
- Develop fuzzy logic control and genetic algorithm for applications in electrical engineering.

UNIT-I:

Artificial Neural Networks:

Introduction, Models of Neuron Network-Architectures –Knowledge representation, Artificial Intelligence and Neural networks–Learning process-Error correction learning, Hebbian learning – Competitive learning-Boltzmann learning, supervised learning-Unsupervised learning– Reinforcement Learning-Learning tasks.

UNIT-II:

ANN Paradigms:

Multi-layer perceptron using Back propagation Algorithm (BPA), Self –Organizing Map (SOM), Radial Basis Function Network-Functional Link Network (FLN), Hopfield Network.

UNIT-III:

Fuzzy Logic:

Introduction –Fuzzy versus crisp, Fuzzy Sets-Membership function –Basic Fuzzy set operations, Properties of Fuzzy sets –Fuzzy Cartesian Product, Operations on Fuzzy relations –Fuzzy logic– Fuzzy Quantifiers, Fuzzy Inference-Fuzzy Rule based system, Defuzzification methods.

UNIT-IV:

Genetic Algorithms:

Introduction-Encoding –Fitness Function-Reproduction operators, Genetic Modeling –Genetic Operators-Cross over-Single site cross over, two points cross over –Multi point cross over Uniform cross over, Matrix cross over-Cross over Rate-Inversion & Deletion, Mutation operator –Mutation – Mutation Rate-Bit-wise operators, Generational cycle-convergence of Genetic Algorithm.

UNIT-V:

Applications Of AI Techniques:

Load forecasting, Load flow studies, Economic load dispatch, Load frequency control, Single area system and two area system, Reactive power control, Speed control of DC and AC Motors.

TEXT BOOKS:

1. S. Rajasekaran and G.A.V.Pai Neural Networks, Fuzzy Logic & Genetic Algorithms, PHI, New Delhi, 2003.
2. Rober J. Schalkoff, Artificial Neural Networks, Tata McGraw Hill Edition, 2011.

REFERENCE BOOKS:

1. P. D. Wasserman; Neural Computing Theory & Practice, Van Nostrand Reinhold, New York, 1989.
2. Bart Kosko; Neural Network & Fuzzy System, Prentice Hall, 1992
3. D. E. Goldberg, Genetic Algorithms, Addison-Wesley 1999.

PROFESSIONAL ELECTIVE -VI

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IV Year B. TECH - II- SEM **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE-VI

(R22A0230)SMART GRID TECHNOLOGY

Course Objectives:

- To group various aspects of the smart grid,
- To defend smart grid design to meet the needs of a utility
- To select issues and challenges that remain to be solved
- To analyze basics of electricity, electricity generation, economics of supply and demand, and the various aspects of electricity market operations in both regulated and deregulated environment.

UNIT- I

Introduction to Smart Grid:

What is Smart Grid? Working definitions of Smart Grid and Associated Concepts –Smart grid Functions-Traditional Power Grid and Smart Grid –New Technologies for Smart Grid – Advantages –Indian Smart Grid –Key Challenges for Smart Grid.

UNIT- II

Smart Grid Architecture:

Components and Architecture of Smart Grid Design –Review of the proposed architectures for Smart Grid. The fundamental components of Smart Grid designs – Transmission Automation – Distribution Automation –Renewable Integration

UNIT- III

Tools and Techniques for Smart Grid:

Computational Techniques –Static and Dynamic Optimization Techniques –Computational Intelligence Techniques –Evolutionary Algorithms –Artificial Intelligence techniques.

UNIT - IV

Distribution Generation Technologies:

Introduction to Renewable Energy Technologies –Micro grids–Storage Technologies –Electric Vehicles and plug –in hybrids –Environmental impact and Climate Change –Economic Issues.

Communication Technologies and Smart Grid:

Introduction to Communication Technology – Synchro-Phasor Measurement Units (PMUs) –Wide Area Measurement Systems (WAMS).

UNIT - V

Control of Smart Power Grid System:

Load Frequency Control (LFC) in Micro Grid System –Voltage Control in Micro Grid System – Reactive Power Control in Smart Grid. Case Studies and Test beds for the Smart Grids.

TEXT BOOKS:

1. Stuart Borlase, Smart Grids, Infrastructure, Technology and Solutions, CRC Press, 2013
2. Gil Masters, Renewable and Efficient Electric Power System, Wiley-IEEE Press, 2004.

REFERENCE BOOKS:

1. A.G. Phadke and J.S. Thorp, “Synchronized Phasor Measurements and their

Applications", Springer Edition, 2010.
2. T. Ackermann, Wind Power in Power Systems, Hoboken, NJ, USA, John Wiley, 2005.

Course Outcomes:

At the end of the course the student will be able to:

- Understand the features of small grid in the context of Indian grid.
- Understand the role of automation in transmission and distribution.
- Apply evolutionary algorithms for smart grid.
- Understand operation and maintenance of PMUs, PDCs, WAMs, and voltage and frequencycontrol in micro grid

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. TECH - II- SEM **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE-VI

(R22A0231)ELECTRICAL DISTRIBUTION SYSTEM

Prerequisites: Power System – I, Power System - II

Course Objectives:

- To distinguish between transmission and distribution systems
- To understand design considerations of feeders
- To compute voltage, drop and power loss in feeders
- To understand protection of distribution systems
- To examine the power factor improvement and voltage control

UNIT - I

General Concepts:

Introduction to distribution system, Distribution system planning, Factors effecting the Distribution system planning, Load modelling and characteristics. Coincidence factor - contribution factor - Loss factor - Relationship between the load factor and loss factor. Load growth, Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

Distribution Feeders:

Design Considerations of Distribution Feeders: Radial, loop and network types of primary feeders, Introduction to low voltage distribution systems (LVDS) and High voltage distribution systems (HVDS), voltage levels, Factors effecting the feeder voltage level, feeder loading, Application of general circuit constants (A,B,C,D) to radial feeders, basic design practice of the secondary distribution system, secondary banking, secondary network types, secondary mains.

UNIT - II

Substations:

Location of Substations: Rating of distribution substation, service area with ‘n’ primary feeders. Benefits derived through optimal location of substations. Optimal location of Substations (Perpendicular bisector rule and X, Y co-ordinate method).

System Analysis:

Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines, analysis of non-three phase systems, method to analyze the distribution feeder cost.

UNIT - III

Protection:

Objectives of distribution system protection, types of common faults and procedure for fault calculations, over current Protective Devices: Principle of operation of Fuses, Auto-Circuit Recloser - and Auto-line sectionalizes, and circuit breakers.

Coordination:

Coordination of Protective Devices: Objectives of protection co-ordination, general coordination procedure, Types of protection coordination: Fuse to Fuse, Auto-Recloser to Fuse, Circuit breaker to Fuse, Circuit breaker to Auto-Recloser.

UNIT - IV

Compensation for Power Factor Improvement:

Capacitive compensation for power-factor control - Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and switched), effect of series capacitors, difference between shunt and series capacitors, Calculation of Power factor correction, capacitor allocation - Economic justification of capacitors - Procedure to determine the best capacitor location.

UNIT - V

Voltage Control:

Voltage Control: Importance of voltage control, methods of voltage control, Equipment for voltage control, effect of shunt capacitors, effect of series capacitors, effect of AVB/AVR on voltage control, line drop compensation, voltage fluctuations.

TEXT BOOKS:

1. Turan Gonen, Electric Power Distribution System Engineering, CRC Press, 3rd Edition 2014.
2. V. Kamaraju, Electrical Power Distribution Systems, Tata Mc Graw Hill Publishing Company, 2nd edition, 2010.

REFERENCE BOOKS:

1. G. Ram Murthy, Electrical Power Distribution hand book, 2nd edition, University press 2004.
2. A.S. Pabla, Electric Power Distribution, Tata McGraw Hill Publishing company, 6th edition, 2013.

COURSE OUTCOMES:

After completion of this course, the student able to

- Distinguish between transmission, and distribution line and design the feeders
- Compute power loss and voltage drop of the feeders
- Design protection of distribution systems
- Understand the importance of voltage control and power factor improvement

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. TECH - II- SEM **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE-VI

(R22A0232)MACHINE LEARNING APPLICATIONS TO ELECTRICAL ENGINEERING

Prerequisites: Mathematics, Python

Course Objectives:

To develop a foundational understanding of machine learning principles and techniques.

To explore and understand how machine learning can be integrated into various electrical engineering applications.

To gain hands-on experience in implementing machine learning algorithms to solve real-world electrical engineering problems.

Course Outcomes:

At the end of this course, students will be able to:

Demonstrate proficiency in applying machine learning algorithms to solve real-world problems in electrical engineering

Integrate machine learning principles effectively into electrical engineering applications,

Enhance problem-solving skills by successfully addressing complex issues in electrical engineering through machine learning.

UNIT-I:

Introduction to Machine Learning:

Definition and types of machine learning, Historical perspective, Basic concepts: supervised learning, unsupervised learning, reinforcement learning

UNIT-II:

Fundamentals of Electrical Engineering Relevant to ML:

Overview of electrical circuits and systems, Signal processing basics, Introduction to control systems

UNIT-III:

Data Preprocessing and Feature Engineering:

Data cleaning and handling missing values, Feature scaling and normalization, Feature extraction and selection

UNIT-IV:

Machine Learning Algorithms for Electrical Engineering Applications

Regression and classification algorithms, Decision trees and ensemble methods, Neural networks and deep learning, Support vector machines, Clustering algorithms for pattern recognition

UNIT-V:

Case Studies and Applications in Electrical Engineering

Power system optimization using ML, Fault detection and diagnostics in electrical systems, Smart grid applications, Signal processing with ML, Control system optimization and adaptive control using ML

TEXT BOOKS:

1. C. Aldrin Renold and Sumathi S., Pattern Recognition and Machine Learning, Wiley India, 2015.
2. S. Rajasekaran and G. Aghila, Machine Learning: An Algorithmic Perspective, Chapman and Hall/CRC,2018 3. Chandra Shekhar Yadav, S. Ramakrishnan, and U. Rajendra Acharya, Machine Learning: Concepts, Methodologies, Tools and Applications, Springer 2018.

REFERENCE BOOKS:

1. Ethem Alpaydin, Introduction to Machine Learning, MIT Press 2010
2. Christopher M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006.
3. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, MIT Press 2012.