BACHELOR OF TECHNOLOGY

R-24 ACADEMIC REGULATIONS

COURSE STRUCTURE

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India)

Programmes Accredited by NBA Accredited by NAAC with A^{+} Grade

Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institute

Maisammaguda (V), Dhullapally (Post), (Via) Kompally, Medchal, Malkajgiri Dist. T.S-500100

1.1 Institute Vision and Mission

Vision

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students
- To offer world class training to the promising Engineers

Mission

- To nurture high level of Decency, Dignity and Discipline in women to attain high intellectual abilities.
- To produce employable students at National and International levels by effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes

Department Vision and Mission

Vision

- To establish the Department of Electronics and Communication Engineering as a center of excellence, nurturing a culture of innovation, continuous learning and research.
- To impart students with a strong foundation in technical knowledge, practical skills, analytical thinking, and problem-solving abilities., empowering them to contribute to technological advancements and enhance the quality of life in society

Mission

- To create an academic environment that empowers students with strong technical knowledge and critical thinking abilities essential for success in the field of electronics and communication engineering.
- To inculcate a culture of innovation and research, enabling our graduates to effectively contribute to technological advancements and meet the constantly changing demands of industry and society.
- To Impart technical education with a strong emphasis on dignity, decency, and discipline to develop professional engineers who are both technically competent and socially responsible.

1.2 PROGRAM EDUCATIONAL OBJECTIVES (PEOs) (5)

PEO1 - Professional Development

To equip students with the ability to acquire knowledge of Mathematics, Science, Engineering, and Technology, applying it professionally within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, while upholding ethical responsibility.

PEO 2:Core Proficiency

To enable students to identify, formulate, comprehend, analyze, design, and solve engineering problems through hands-on experience in various technologies, utilizing modern tools essential for engineering practice and research to meet the needs of society and industry.

PEO 3: Technical Accomplishments

To equip students with the ability to design, simulate experiment, analyze, optimize, and interpret core applications, harnessing their creativity and innovation through multidisciplinary concepts and contemporary learning to develop them as professional engineers.

PEO4 – Professionalism

To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, responsibility, accountability, multidisciplinary approach and capability to relate engineering issues to broader social context.

PEO5 - Learning Environment

To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, inventiveness and the life-long learning to become a successful professional in Electronics and Communication Engineering.

1.3 PROGRAM SPECIFIC OBJECTIVES (PEOs) (3)

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PSO1

The ability to analyze, design and implement application specific electronic system for complex engineering problems for analog, digital domain, communications and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2

The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning

PSO3

Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Government of India)
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Maisammaguda, Dhulpally, Secunderabad 500100

COURSE STRUCTURE

I Year B. Tech – I Semester

S.No	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2400BS01	Linear Algebra and Differential Equations	3	1	0	4	40	60
2	2405ES01	Programming for Problem Solving	3	0	0	3	40	60
3	2402ES02	Basic Electrical Engineering	2	0	0	2	40	60
4	2400BS05	Applied Physics	3	1	0	4	40	60
5	2404ES61	Elements of Electronics and Communication Engineering Lab	0	0	2	1	40	60
6	2405ES61	Programming for Problem Solving Lab	0	0	5	2.5	40	60
7	2402ES62	Basic Electrical Engineering Lab	0	0	2	1	40	60
8	2400BS61	Applied Physics lab	0	0	2	1	40	60
9	2403ES61	Engineering Workshop	0	0	3	1.5	40	60
10	2400MC01	Environmental Science*	2	0	0	0	100	
		Induction Programme	-	-	-	-		
		TOTAL	**13**	**2**	**14**	**20**	**460**	**540**

I Year B. Tech – II Semester

S.No	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2400BS02	Numerical Techniques and Vector Calculus	3	1	0	4	40	60
2	2404ES01	Electronic Devices and Circuits	3	1	0	4	40	60
3	2400BS06	Engineering Chemistry	3	0	0	3	40	60
4	2400HS01	English for Skill Enhancement	2	0	0	2	40	60
5	2403ES01	Computer Aided Engineering Graphics	1	0	4	3	40	60
6	2400BS62	Engineering Chemistry Lab	0	0	2	1	40	60
7	2404ES62	Electronic Devices and Circuits Lab	0	0	3	1.5	40	60
8	2400HS61	English Language and Communication skills Lab	0	0	3	1.5	40	60
	2400MC02	French Language/ German*	2	0	0	0	100	
		TOTAL	**14**	**2**	**12**	**20**	**420**	**480**

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS01: LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

B.TECH I YEAR I SEMESTER

L	T	P	C
3	1	0	4

Course Objectives: To learn

- Types of Matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Study concept of Eigen values and Eigen vectors.
- Methods for solving the first and higher order differential equations.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two variables.
- Geometrical approach to the mean value theorems, their application to mathematical problems.

Course Outcomes:

After learning the contents of this course, the student must be able to

- Understand and construct the matrix representation of a set of linear equations, and analyze the solution of the system of equations.
- Determine and compute the Eigen values and Eigenvectors of a given matrix.
- Solve first-order and higher-order differential equations.
- Apply techniques to find the extreme values of functions of two variables.
- Solve problems and applications related to the Mean Value Theorems.
- Analyze and interpret the results from solving systems of linear equations, Eigenvalue problems, differential equations, and optimization problems in multivariable functions.

UNIT-I: 10 L

Matrices: Types of Matrices, Symmetric; Skew-symmetric; Hermitian; Skew-Hermitian; Orthogonal matrices; Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II: 10 L

Eigen values and Eigen vectors: Eigen values and Eigenvectors and their properties (only statements);Cayley-Hamilton Theorem (without proof); Finding inverse and powers of a matrix by Cayley-Hamilton Theorem; Diagonalization of a matrix.**Vector Space, basis, linear dependence and independence (Only Definitions).**

UNIT-III: 10L

Ordinary Differential Equations: Exact differential equations, Linear and Bernoulli's equations. Applications:Newton's law of cooling. Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, ***sin ax, cos ax***, polynomials in x, $e^{ax}V(x)$ and $xV(x)$,

UNIT-IV: 9 L

Partial Differentiation: Definitions of Limit and Continuity. Partial Differentiation; Euler'sTheorem; Total derivative; Jacobian; Functional dependence & independence, Maxima andminima of functions of two variables.

UNIT-V: 9 L

Differential Calculus: Rolle's mean value theorem (without proof), Lagrange's Mean value theorem (without proof) with their Geometrical Interpretation, Cauchy's Mean value Theorem (without proof).

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2017.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics,Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9thEdition,2013.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,38th Reprint, 2022.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 9thEdition, Reprint, 2002.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2405ES01: PROGRAMMING FOR PROBLEM SOLVING

B.TECH I YEAR I SEMESTER **L T P C**
3 0 0 3

Course Objectives:

- To understand the various steps in program development.
- To learn the syntax and semantics of C programming and Python.
- Understand Lists, Dictionaries and Tuple in Python.
- To learn the usage of structured programming approach in C Programming.
- Implement Object Oriented Programming concepts in Python

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs, Demonstrate proficiency in handling Strings and File Systems.
- Interpret the concepts of Object-Oriented Programming as used in Python.

UNIT I:

Introduction to C Programming: Structure of a C program, Identifiers, Variables (with data types and space requirements), Operators, Precedence and Expression evaluation, Type conversion.

UNIT II:

Conditional Branching and Loops: Writing and Evaluation of Conditionals with If, If-Else, else-if ladder Switch-Case, goto, Iteration with For, While, Do While Loops

Arrays: One-Two-Dimensional Arrays, Creating, Accessing and Manipulating Elements of Arrays. **Strings:** Introduction To Strings, Handling Strings as Array of Characters, Basic String Functions available in C (Strlen, Strcat, Strcpy, Strstr Etc.), Arrays of Strings.

UNIT – III

Functions: Declaring a function, Parameters and return type of a function, passing parameters to functions, Recursive Functions.

Structures: Defining structures, initializing structures, unions.

Pointers: Idea of pointers, Defining pointers, Pointer to Pointer, Dynamic Memory Management functions(DMA)

File Handling in C: Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

UNIT – IV

Introduction to Python Programming:Modes: Interactive Mode, Scripting Mode, Identifiers, Keywords, Variables, Comments, Lines and Indentations, Quotations, Assigning Values to Variables, Data Types in Python, Mutable Vs Immutable, Fundamental Data Types: int, float, complex, bool, str, Advanced Data Types(List, Tuple, Dictionary, set, etc..).

Decision Making Statements: if Statement, if-else Statement, elif Statement. Looping Statements: For and While loops, Nested loops, using else Statement with loops, Control Statements: break Statement, continue Statement, Pass Statement.

Python Slicing & Indexing: Forward Direction Slicing with +ve Step, Backward Direction Slicing with -ve Step, Built-in String Functions.

UNIT – V

Python Functions: Creating a Function, Function Calling, Parameters in Function,Types of Arguments,Scope of Variables, Python Built-in Functions. Python Lambda Functions.

Python File Handling: Opening a File, Reading the File, Read Lines of the File, Writing the File, creating a New File Using with Statement with Files, File Pointer Position, Modifying File Pointer Position Renaming the File & Removing the File, Writing Python Output to the Files File Related Methods.

Text Books:

1. Computer Science: A Structured Programming Approach Using C, B. A. ForouzanandR. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Second Edition, Oxford University Press.
3. Core Python Programming, Wesley J. Chun, Second Edition, Pearson

Reference Books:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) PvtLtd.
3. Programming Languages, A.B. Tucker, R.E. Noonan, TMH.
4. Programming Languages, K. C. Louden and K A Lambert., 3rd edition, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402ES01: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.TECH I YEAR I&II SEMESTER **L T P C**
3 0 0 3

Course Objectives

1. Emphasis on basic elements in electrical circuits and concepts of DC circuits.
2. To analyze DC Circuits using Network Theorems
3. To analyze AC circuits through AC fundamentals.
4. Construction, operational features of energy conversion devices i.e. DC and AC machines.
5. To familiarize the fundamentals, applications of electronic devices & circuits.
6. To acquire the knowledge of various logical operations, basic number systems and logic gates.

Course Outcomes: After going through this course, the student gets a thorough knowledge on

1. Understand and apply basic concepts of electrical circuits and networks.
2. Solve electrical circuits using various network theorems.
3. Explain the constructional details and principles of operation of electrical machines.
4. Understand the operation of different semiconductor devices, including diodes and BJTs, and analyze their voltage-current characteristics.
5. Comprehend and apply number systems, complements of numbers, and logic gates in digital systems.
6. Analyze and solve problems involving electrical circuits, electrical machines, semiconductor devices, and digital systems.

UNIT I

DC And AC Circuits

Electrical circuit elements (R, L, and C), Ohm's Law and its limitations, KCL &KVL, series, parallel, series-parallel circuits, Thevenin's, Norton's, and Super Position theorem, and Simple numerical problems.

A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, and peak factor, (Simple Numerical problems).

UNIT II

Electrical Machines

Construction and working principle of DC Motor, DC Generator, Single Phase Transformer, Three Phase Induction Motors and Alternator, Applications of electrical machines. (Elementary Treatment only)

UNIT III

Semi conductor Devices

Introduction - Characteristics of PN Junction Diode- Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics.

UNIT IV

Number Systems and Boolean Algebra

Overview of Number Systems, 1's complement and 2's Complement, BCD codes, Excess-3 codes, Boolean Algebra-Basic Theorems and properties.

UNIT V

Logic Gates

Logic Gates–NOT,OR, AND, NOR, NAND, XOR, XNOR, and Universal Gates. Truth Tables and Functionality.

Text Books:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, Tata McGraw Hill.
2. A text book of Electrical TechnologyVol- 1, 2 by B.L.Theraja and A K Theraja- S Chand Publications.
3. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, Tata McGraw-Hill companies.

Reference Books:

1 Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press

2. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402ES02: BASIC ELECTRICAL ENGINEERING

B.TECH I YEAR I SEMESTER **L T P C**
2 0 0 2

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.

Course Outcomes:

After learning the course the student will be able to

1. Apply network laws and theorems to analyze and solve electrical circuits.
2. Understand the fundamental concepts and principles involved in basic electrical circuits and analyze their behavior.
3. Study and explain the working principles of various electrical machines, including their operation and applications.
4. Explore the components and design principles of low voltage electrical installations.
5. Analyze the performance of electrical machines in practical applications.
6. Evaluate and design electrical circuits and low voltage installations based on standard practices and operational requirements.

UNIT-I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL & KCL, analysis of simple circuits with DC excitation. Super position, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II

A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series only), resonance in series RLC circuit. Star and delta transformation

UNIT-III:

Transformers: Ideal and practical transformer working operation, equivalent circuit, losses in transformers, regulation, and efficiency. Three-phase circuits, voltage and current relations three- phase transformer connections.

UNIT-IV:

Electrical Machines: DC motor – Construction and working- Speed Control-Torque Speed Characteristics. Three-phase induction motor-Construction and working -Torque-slip characteristics. Construction and working of synchronous generators.

UNIT-V:

Electrical Safety and Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Elementary calculations for energy consumption.

Text-Books:

1. Basic Electrical Engineering-D.P.Kothari and I.J.Nagrath,3rd edition 2010,Tata Mc Graw Hill.
2. D.C.Kul shreshtha,"Basic Electrical Engineering",McGrawHill,2009.
3. L.S.Bobrow, Fundamentals of Electrical Engineering",OxfordUniversityPress,2011

Reference-Books:

1. Electrical and Electronics Technology, E.Hughes,10thEdition,Pearson,2010
2. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India,1989.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS05: APPLIED PHYSICS

B.TECH I YEAR I&II SEMESTER **L T P C**
3 1 0 4

Course Objectives

- To familiarize students with demonstrating skills in scientific enquiry, problem solving and laboratory techniques.
- To develop demonstrate competency and understanding of the concepts found in quantum mechanics.
- To solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- To develop an understanding of fundamentals and properties of engineering materials.

Course Outcomes: Upon graduation:

1. Understand the fundamental principles and multiple concepts of quantum mechanics and solid-state physics.
2. Identify and comprehend the key vocabulary and basic concepts of semiconductor diodes, including p-n junction diodes and Zener diodes, along with their characteristics.
3. Gain knowledge of the classification and working principles of various optoelectronic devices, lasers, and optical fibers, and explore their applications in science and technology.
4. Understand and explain the properties and applications of dielectric materials in engineering.
5. Study the properties and uses of magnetic materials in engineering and technology.
6. Analyze and apply the concepts of quantum mechanics, semiconductor devices, optoelectronics, and material science in practical engineering contexts.

UNIT - I

QUANTUM MECHANICS

Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh- Jean's law, Planck's radiation law - Photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – Time independent Schrodinger wave equation - particle in one dimensional potential box.

UNIT – II

ELECTRON THEORY OF METALS AND BAND THEORY OF SOLIDS

Electron Theory of Metals: Free electron theory (merits & demerits-qualitative)- quantum free electron theory, expression for electrical conductivity - Fermi-Dirac distribution function.

Band Theory of Solids: Bloch's theorem - Kronig-Penney model (qualitative) – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - III

SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Carrier transport: diffusion and drift - Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode - LED, PIN diode, avalanche photo diode (APD) and solar cells, their

structure, materials, working principle and characteristics.

UNIT-IV
LASERS AND FIBER OPTICS

Lasers: Characteristics of Lasers, Interaction of radiation with matter: stimulated absorption, spontaneous and stimulated emission, Einstein's relations, Principle and working of Laser: Population inversion, Pumping mechanisms, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor lasers - Applications of laser.

Fiber Optics: Introduction to Optical fiber, Optical fiber as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, mode and transmission of signal through Step and Graded index fibers, Losses associated with optical fibers, Applications of optical fibers in communication system – applications of optical fibers in other fields.

UNIT - V
DIELECTRIC AND MAGNETIC MATERIALS

Dielectric Materials: Electric dipole, dipole moment, dielectric constant, polarizability, electric displacement, electric susceptibility, types of polarization: electronic, ionic (quantitative) and orientation polarizations, space-charge (qualitative), Internal fields in a solid, Clausius Mossotti equation, Ferroelectrics, Piezo electrics and Pyro electrics, Applications of dielectrics.

Magnetic Materials: Introduction**-** origin of magnetic moment **-** Classification of magnetic materials, dia, para, ferro, anti-ferro and ferri - Hysteresis curve - soft and hard magnetic materials - applications of magnetic materials.

Text Books:

1. Engineering physics, B.K. Pandey, S. Chaturvedi- Cengage learning.
2. Halliday and Resnick, Physics, Wiley.
3. A text book of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar- S. Chand (11e).

Reference Books:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL
4. "Semiconductor Physics and Devices", Mc Graw Hill, 4th Edition by Donald Neamen
5. Introduction to Solid State Physics by Charles kittel, wiley student edition.
6. S.M.Sze, Semiconductor Devices: Physics and Technology, wiley (2008)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS06: ENGINEERING CHEMISTRY

B.TECH I YEAR I&II SEMESTER **L T P C**

3 0 0 3

COURSE OBJECTIVES

- To acquire the knowledge of water treatment which are essential for the Engineers and in industry.
- To include the importance of fundamental aspects of battery chemistry, significance of corrosion and it's control to protect the structures.
- To account the applications of different kinds of polymers in various fields.
- To imbibe the basic concepts of petroleum products**.**
- To impart the basic knowledge of smart materials which have excellent engineering applications.

COURSE OUTCOMES:

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

1. Understand modern technologies related to water utilization in industry and interpret the challenges involved in industrial water management.
2. Apply principles of battery technology and corrosion to predict and analyze system behavior under varying conditions.
3. Acquire knowledge of polymer science, including classification, properties, and practical applications in engineering.
4. Analyze the potential applications of petroleum products and understand their practical utility for engineers and entrepreneurs.
5. Understand and apply the principles of smart materials to develop solutions for various engineering challenges.
6. Use the knowledge of water utilization, battery technology, corrosion, polymers, petroleum products, and smart materials to address real-world engineering problems and innovations.

UNIT - I:

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness, Numerical problems. Estimation of hardness of water by complexometric method. Potable water and its specifications - Steps involved in the treatment of potable water – Disinfection of potable water by chlorination and break - point chlorination.

Boiler troubles: Scales, Sludges and Caustic Embrittlement. Internal treatment of Boiler feed water - Calgon conditioning, Phosphate conditioning. External treatment methods - Softening of water by ion- exchange processes. Desalination of water –Reverse osmosis.

UNIT - II:

Battery Chemistry and Corrosion

Introduction- Classification of batteries-primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications ofZn-air and Lithium-ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences

between battery and a fuel cell, Construction and applications of solid oxide fuel cell.**Electrochemical sensors:** Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose.

Corrosion: Causes and effects of corrosion,Theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanizing and Tinning.

UNIT-III

Polymeric materials

Definition–Classification of polymers with examples–Types of polymerizations–addition (free radical addition) and condensation polymerization–Nylon 6,6. Glass transition temperature (Tg).

Plastics: Definition and characteristics-thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC, Bakelite and Teflon. Fiber reinforced plastics (FRP)-Applications.

Conducting polymers: Characteristics and classification of conducting polymers with examples. Mechanism of conduction in trans-polyacetylene. Applications of conducting polymers.

Biodegradable polymers: Concept and advantages- Polyvinyl alcohol and its applications.

UNIT – IV

Energy Sources:

Introduction, Classification-solid fuels: coal– analysis of coal–proximate and ultimate analysis and their significance. Liquid fuels–petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol-Fischer-Tropsch's process; Gaseous fuels–composition and uses of natural gas, LPG and CNG. Biodiesel-transesterification and advantages.

UNIT - V:

Smart materials and their engineering applications

Introduction- Classification of smart materials, chromic materials- photo, electric, and thermochromic materials.Workingprinciple and applications ofshape memory alloys- Nitinol, piezoelectric materials- Rochelle salt,thermoresponsive materials- PNIPAM, self-healing materials- Sulphur-Selenium alloy magnetostrictive material- ALFENOL, GALFENOL electrostrictive materials- PMN, polyurethane.

Suggested Text Books:

1. Engineering Chemistry by P.C.Jain and M. Jain, Dhanpatrai Publishing Company,2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.
4. Text book of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.
5. Bahadur Sastry N V, Principles of Polymer Science, 2002, Narosa Publishing Co, New Delhi.
6. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi(2015)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2403ES01: COMPUTER AIDED ENGINEERING GRAPHICS

B.TECH I YEAR I&II SEMESTER **L T P C**
1 0 4 3

Course Objectives:

1. To impart conceptual knowledge about AutoCAD software in creating, editing and manipulating 2D engineering drawings.
2. To inculcate the required skills to apply engineering drawing principles effectively for accurately sketching conics and cycloids.
3. To enhance visualization skills for better interpreting the position of points and lines, enabling accurate representation of their orthographic projections.
4. To familiarize drafting skills for constructing orthographic views of planes and solids in diverse orientation.
5. To develop the competency in creating isometric views from orthographic views and vice- versa.

Course Outcomes:

Upon the completion of the course, the students should be able to:

1. Demonstrate proficiency in using AutoCAD software to create, edit, and manipulate 2D engineering drawings.
2. Apply engineering drawing concepts to sketch conic sections and cycloids with precision.
3. Analyze and determine the position of points and lines for accurate orthographic projections.
4. Sketch and interpret orthographic projections of planes and solids, considering their different orientations.
5. Evaluate orthographic projections and develop corresponding isometric views, and vice versa.
6. Integrate the skills of AutoCAD and engineering drawing techniques to accurately represent and visualize 3D objects from 2D projections.

UNIT-I:

Introduction to AutoCAD Software:

Menu Bar, Ribbon – Draw and Modify Toolbar, Dimension etc., Drawing Area - Background, Crosshairs, Coordinate System, Dialog boxes and windows, Shortcut menus, The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects - Basic geometrical constructions using AutoCAD commands.

Introduction to Engineering Drawing: Principles of Engineering drawing and their significance, Conventions.

Engineering Curves: Construction of Ellipse, Parabola, Hyperbola - General method and Special methods

Cycloidal Curves - Cycloid, Epicycloid and Hypocycloid.

UNIT-II:

Orthographic Projections, Projections of Points & Straight Lines:

Principles of Orthographic Projections – Conventions; Projections of points; Projections of lines – Line parallel to one plane and both the planes, line inclined to one plane and parallel to other plane, Line inclined to both the planes;

UNIT-III:

Projections of Planes:

Projections of Planes - Surface parallel to one plane and perpendicular to other plane, Surface Inclined to one plane and perpendicular to other plane, Surface inclined to both the planes.

UNIT-IV:

Projections of Regular Solids:

Projections of Regular Solids - Prisms, Pyramids, Cylinder and Cone – Axis parallel to one plane and perpendicular to other plane, Axis inclined to one plane and parallel to other plane, Axis inclined to both the planes.

UNIT-V:

Isometric Projections:

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound solids.

Conversion of Isometric View to Orthographic Views and Vice-versa, Conventions.

Introduction to Solid Modeling: Creation of simple solid models relevant to the domain.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt – N.D. Bhatt & V.M Panchal, 48th Edition, 2005 Charotar Publishing House, Gujarat.
2. Engineering Drawing / Basant Agarwal and MC Agarwal / McGraw Hill

REFERENCES:

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publisher.
3. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
4. "Computer Aided Engineering Drawing"by Dr. M H Annaiah, Dr C N Chandrappa and Dr B SudheerPremkumar Fifth edition, New Age International Publishers.
5. Engineering Drawing by K.VenuGopal&V.Prabu Raja New Age Publications

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400HS01: ENGLISH FOR SKILL ENHANCEMENT

B.TECH I YEAR I&II SEMESTER **L T P C**
2 0 0 2

COURSE OBJECTIVES

This course will enable the students to:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills
- Develop study skills and communication skills in various professional situations.
- Study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

COURSE OUTCOMES:

Students will be able to:

- Understand the importance of vocabulary and sentence structures.
- Choose appropriate vocabulary and sentence structures for their oral and written Communication.
- Demonstrate their understanding of the rules of functional grammar.
- Develop comprehension skills from the known and unknown passages.
- Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
- Acquire basic proficiency in reading and writing modules of English.

UNIT – I

Chapter entitled **'Toasted English' by R. K. Narayan** from **"English: Language, Context and Culture"** published by Orient Black Swan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes – Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Transformation of Sentences: Simple-Complex-Compound and vice-versa. **Importance of Proper Punctuation**- Techniques for writing precisely – Paragraph Writing – Types, Structures

and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Do

UNIT – II

Chapter entitled **'Appro JRD' by Sudha Murthy** from "**English: Language, Context and Culture"** Published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Misspelt - **Homophones, Homonyms and Homographs**

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice; Book Review

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events– Classifying- Providing Examples or Evidence

UNIT – III

Chapter entitled **'Lessons from Online Learning' by F. Haider Alvi, Deborah Hurst et al** from **"English: Language, Context and Culture"** published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, **Email Etiquette**, Job Application with CV/Resume

UNIT – IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from "**English: Language, Context and Culture"** published by Orient Black Swan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (**SQ3R Method**) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion

UNIT – V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from **"English: Language, Context and Culture"** published by Orient Black Swan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage; One Word Substitution; Phrasal Verbs.

Grammar: Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

Reading: Reading Comprehension-Exercises for Practice

Writing: **Précis Writing**; Technical Reports- Introduction – Characteristics of a Report;Technical Reports-Categories of Reports Formats-Structure of Reports

(Manuscript Format)-Writing a Report.

TEXT BOOK:

1. **"English: Language, Context and Culture"** by Orient Black Swan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

- English for Engineers P.(2018) Cambridge university Press
- Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
- Zinsser, William. (2001). On Writing Well. Harper Resource Book.
- Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
- Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
- Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press
- Effective Academic Writing by Liss and Davis (OUP)
- Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2405ES61: PROGRAMMING FOR PROBLEM SOLVING LAB

B.TECH I YEAR I SEMESTER **L T P C**

0 0 5 2.5

Course Objectives: The students will learn the following:

- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.

Course Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- represent and manipulate data with arrays, strings and structures
- Student able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

WEEK 1:

1. 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 operand values from standard input
2. Write a program for find the max and min from the three numbers.

WEEK 2:

1. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
2. 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)
3. Write a program that prints a multiplication table for a given number and the number of rows in the 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

WEEK 3:

1. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
2. 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. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to read in two numbers, x and n, and then compute the sum of this Geometric progression:1+x+x^2+x^3+…….. +x^n. For example: if n is 3 and x is5,then the program computes 1+5+25+125.

WEEK 4:

1. Write a C program to find the minimum, maximum and average in an array of integers
2. Write a C program that uses functions to perform the following:
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices
3. Write C programs that use both recursive and non-recursive functions
   a. To find the factorial of a given integer.
   b. To find the GCD (greatest common divisor) of two given integers.
4. Write a program through pointer variable to sum of n elements from array.

WEEK 5:

1. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba,etc.)
2. Write a C program to insert a sub-string in to a given main string from a given position.
3. Write a C program to count the lines, words and characters in a giventext.

WEEK 6:

1. Write a C program to store information of 5 students usingstructures.
2. Write a C program to access members of union?
3. Write a C program to display the contents of a file to standard output device.
4. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

WEEK 7:

1. Python program to print "Hello Python"
2. Write a program that computes and prints the result of 512 − 282 /47 · 48 + 5 .It is roughly .1017
3. Ask the user to enter a number. Print out the square of the number but use the sep optional argument to print it out in a full sentence that ends in a period. Sample output is shown below. Enter a number: 5
   The square of 5 is 25.
4. Ask the user to enter a number x. Use the sep optional argument to print out x, 2x, 3x, 4x, and 5x, each separated by three dashes, like below.
   Enter a number: 7
   7---14---21---28---35

WEEK 8:

1. Write a program that asks the user to enter a length in centimetres. If the user enters a negative length, the program should tell the user that the entry is invalid. Otherwise, the program should convert the length to inches and print out the result. There are 2.54 centimetres in an inch.
2. Write a program that asks the user how many credits they have taken. If they have taken 23 or less, print that the student is a freshman. If they have taken between 24 and 53, print that they are a sophomore. The range for juniors is 54 to 83, and for seniors it is 84 and over.
3. A year is a leap year if it is divisible by 4, except that years divisible by 100 are not leap years unless they are also divisible by 400. Write a program that asks the user for a year and prints out whether it is a leap year or not
4. A number is called a perfect number if it is equal to the sum of all of its divisors, not including the number itself. For instance, 6 is a perfect number because the divisors of 6 are 1, 2, 3, 6 and 6 = 1 + 2 + 3.

WEEK 9:

1. Write a program that computes the factorial of a number. The factorial, n!, of a number n is the product of all the integers between 1 and n, including n.
   For Example: $5! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 = 120$
2. The Fibonacci numbers are the sequence below, where the first two numbers are 1, and each number thereafter is the sum of the two preceding numbers. Write a program that asks the user how many Fibonacci numbers to print and then prints that many.
   1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89 . . .
3. Write a program that asks the user to enter a string. The program should then print the following:
   (a) The total number of characters in the string
   (b) The string repeated 10 times
   (c) The first character of the string (remember that string indices start at 0)
   (d) The first three characters of the string
   (e) The last three characters of the string
   (f) The string backwards
   (g) The seventh character of the string if the string is long enough and a message otherwise
   (h) The string with its first and last characters removed
   (i) The string in all caps
   (j) The string with every a replaced with an e
   (k) The string with every letter replaced by a space.

WEEK 10:

1. Write a program that asks the user to enter a string. The program should create a new string called new string from the user's string such that the second character is changed to an asterisk and three exclamation points are attached to the end of the string. Finally, print new string. Typical output is shown below:

Enter your string: Qbert

Q*ert!!!

2. A website requires the users to input username and password to register. Write a program to check the validity of password input by users.

   Following are the criteria for checking the password:

   1. At least 1 letter between [a-z]
   2. At least 1 number between [0-9]
   3. At least 1 letter between [A-Z]
   4. At least 1 character from [$#@]
   5. Minimum length of transaction password: 6
   6. Maximum length of transaction password: 12

   Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma.

   Example If the following passwords are given as input to the

   program: Then, the output of the program should be:

   ABd1234@1

3. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized

   Suppose the following input is supplied to the

   program: Hello world

   Practice makes perfect

   Then, the output should

   be: HELLO WORLD

   PRACTICE MAKES PERFECT

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402ES61: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

LAB B.TECH I YEAR I&II SEMESTER **L T P C**

0 0 2 1

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 acquire the knowledge of various logic gates.

COURSE OUTCOMES:

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

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving them.
3. Understand the Basic Networks theorems
4. Perform the required tests on transformers and DC motors.
5. Plot the characteristics of Zener diodes.
6. Select suitable gates for particular application

LIST OF EXPERIMENTS

1. Verification of Ohm's Law
2. Verification of KVL and KCL.
3. Verification of Thevenin's theorem.
4. Verification of Norton's theorem.
5. Verification of Superposition theorem.
6. Load test on DC shunt Motor.
7. Load test on DC compound Motor
8. Measurement of voltage, and current of a single-phase transformer
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Realization of logic gates.
12. Transistor CE Characteristics
13. Transistor CB Characteristics
14. Transistor CC Characteristics

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402ES62: BASIC ELECTRICAL ENGINEERING LAB

B.TECH I YEAR I SEMESTER **L T P C**

0 0 2 1

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes: After learning the lab course the student will be able to

1. Gain exposure to basic electrical laws and their application in electrical circuits.
2. Understand and analyze the response of different types of electrical circuits to various excitations.
3. Measure, calculate, and relate basic electrical parameters such as voltage, current, resistance, and power.
4. Understand the operating principles and characteristics of transformers.
5. Comprehend the basic principles, operation, and characteristics of electrical machines.
6. Apply the knowledge of electrical laws, circuit analysis, and machine characteristics to solve practical electrical engineering problems.

List of experiments

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL and RC circuits using DC excitation
4. Transient Response of RLC Series circuit using DC excitation
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
13. Performance Characteristics of a Three-phase Induction Motor
14. Torque-Speed Characteristics of a Three-phase Induction Motor
15. No-Load Characteristics of a Three-phase Alternator

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS61: APPLIED PHYSICS LAB

B.TECH I YEAR I&II SEMESTER **L T P C**

0 0 2 1

Course Objectives

- To introduce the spirit of experiments to verify physics concepts such as energy band gap, photoelectric effect, Hall Effect and so on.
- To design, develop, characterized and study properties of materials, help the students to prepare new materials for various engineering applications.
- To perform experiments to estimate the device properties and check their suitability in science and technology.
- To teach and apply knowledge to measure and verify the values of certain constants in physics.

Course Outcomes: Upon graduation:

- Demonstrate an understanding of fundamental physics concepts and laws through experimental procedures.
- Analyze the characteristics and performance of optoelectronic devices.
- Conduct experiments to determine energy band gap, Hall coefficient, dielectric constant, and numerical aperture.
- Understand and apply the concept of magnetic induction in practical scenarios.
- Interpret and report experimental results with accuracy and scientific reasoning.
- Develop proficiency in using laboratory instruments and techniques for physics experiments..

Note: Any 8 experiments to be performed.

1. **Energy gap of a PN junction diode.**

   To determine the energy band gap of a semiconductor p-n junction diode

2. **Solar cell**

   To study the V-I characteristics of a give solar cell.

3. **Light emitting diode**

   To study the V-I characteristics of a light emitting diode.

4. **Stewart and Gee's experiment**

   To determine the magnetic induction at the center and at several points on the axis of a circular coil.

5. **Hall Effect experiment**

   Determination of Hall coefficient and Hall voltage

   To calculate the Hall coefficient and carrier concentration of the sample material.

6. **Photoelectric effect.**

   To determine the work function of a given material.

7. LASER diode

To study characteristics of laser diode.

8. Zener diode

To study the V-I characteristics of Zener diode and determine the break down voltage.

9. A) Optical Fibre Numerical aperture

To determine the numerical aperture (NA) of the given optical fibre.

B) Optical Fibre bending loss

To determine the loss caused in optical fiber in dB due to macro bending of the fibre.

10. Determination of dielectric constant.

To determine the dielectric constant of a capacitor by charging and discharging method.

Reference Books:

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2403ES61: ENGINEERING WORKSHOP

B.TECH I YEAR I&II SEMESTER **L T P C**

0 0 3 1.5

Course Objectives:

1. To Study different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. To study commonly used carpentry joints and to have practical exposure to various welding and joining processes.

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

1. Study and practice on machine tools and their operations.
2. Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, and foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades
4. Identify Engineering processes including drilling, material removing, measuring, chiseling.
5. Apply basic electrical engineering knowledge for house wiring practice.
6. Study commonly used carpentry joints.

TRADES FOR EXERCISES:

I. Carpentry

1. Cross lap joint
2. Dovetail Joint

II. Fitting

1. Straight Fitting
2. V- fitting

III. Tin Smithy

1. Rectangular Tray
2. Open Scoop

IV. House Wiring

1. Two bulbs controlled by one way switch (Series and parallel connection)
2. One bulb controlled by two-two way switches (Stair case connection).

V. Foundry

1. Single piece pattern
2. Split-piece pattern

VI. Black Smithy

1. Round to Square
2. S - Hook

Trades for Demonstration:

1. Plumbing
2. Welding
3. Machine Shop
4. Power tools

TEXT BOOKS:

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Elements of Workshop Technology Vol.1 & 2, S. K. Hajra Choudhury, A. K. Hajra Choudhury and Nirjhar Roy, 13th Edition, Media Promoters & Publishers Pvt. Ltd., 2010.

REFERENCE BOOKS:

1. Workshop Manual / Venkat Reddy/
BSP Workshop Manual / K Venu Gopal /
Anuradha

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS62: ENGINEERING CHEMISTRY LAB

B.TECH I YEAR I&II SEMESTER **L T P C**
0 0 2 1

COURSE OBJECTIVES

The course consists of experiments related to the principles of chemistry required for engineering student. The student will able to learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- To measure the physical properties like adsorption, surface tension and viscosity.
- To synthesize polymers like polyaniline and urea-formaldehyde resin.
- To summarize the data and find the applicability to real world scenario.

COURSE OUTCOMES

- Measure the hardness and chloride content in water and interpret its significance in water quality assessment.
- Perform conductometry, potentiometry, and pH metry to determine the equivalence points of acids accurately.
- Examine and predict the significance of properties like adsorption, viscosity, and surface tension in various applications.
- Demonstrate the ability to synthesize polymers and understand their industrial applications.
- Apply acquired chemical analysis skills to address real-world and societal challenges.
- Develop hands-on expertise in chemical analysis techniques and their practical implications.

List of Experiments

Volumetric Analysis:

1. Determination of total hardness of water by complexometric method using EDTA.
2. Determination of chloride content of water by Argentometry.
3. **Conductometry:** Estimation of an HCl by Conductometric titrations.
4. **Potentiometry:** Estimation of Fe^{2+} by Potentiometry using $KMnO_4$ **.**
5. **pH Metry:** Estimation of HCl by pH metry.

Lubricants:

6. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.

7. Determination of acid value of lubricant oil
8. Determination of surface tension of a give liquid using stalagmometer.

Preparations:

9. Synthesis of polyaniline.
10. Synthesis of urea-formaldehyde resin.

Virtual lab experiments:

11. Batteries for electrical vehicles.
12. Functioning of solar cell and its applications.
13. Smart materials for Biomedical applications.

Text books:

1. Laboratory Manual on Engineering Chemistry, S. K. Bhasin and Sudha Rani, Dhanpat Rai Publications.

2. College Practical Chemistry V. K. Ahluwalia, Sunitha Dhingra, Adargh Gulati, University Press Pvt. Ltd.

3. Practical Chemistry, Dr. O. P. Pandey, D. N. Bajpai, and Dr. S. Giri, S. Chand.

4. Lab manual for Engineering chemistry by B. Rama devi and P. Aparna, S Chand Publications, New Delhi (2022)

References:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)

2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)

3. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara.

4. https://www.electronics-notes.com/articles/electronic_components/battery-technology/li-ion- lithium-ion-technology.php.

5. https://www.gamry.com/application-notes/physechem/dssc-dye-sensitized-solar cells.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400HS61: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

B.TECH I YEAR I&II SEMESTER **L T P C**

0 0 3 1.5

The English Language and Communication Skills (ELCS) Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

COURSE OBJECTIVES:

The course will

- Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- Sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- Bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- Improve the fluency of students in spoken English and neutralize the impact of dialects.
- Train students to use language appropriately for public speaking, group discussions and presentations.

COURSE OUTCOMES:

Students will be able to:

- Develop a deeper understanding of the English language using audio-visual materials and interactive group activities.
- Improve listening comprehension through exposure to diverse accents and spoken English contexts.
- Adapt pronunciation and neutralize accent for better intelligibility in communication.
- Speak with clarity, accuracy, and confidence in various professional and social settings.
- Develop communication skills that enhance job readiness and career prospects.
- Engage in group discussions and teamwork to refine language proficiency and interpersonal skills.

SYLLABUS

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

LISTENING SKILLS

Objectives

- To develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

Students will be given practice in listening to the sounds of the language, to be able to recognize them and distinguish between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening for specific information
- Intensive Listening
- Inference Listening

SPEAKING SKILLS

Objectives

- To involve students in spoken language activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – **Minimal Pairs** -Consonant Clusters- Past Tense Marker and Plural Marker- Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Detail& Specific Details.
Practice: Listening Comprehension Tests - Testing Exercises **ICS Lab:**
Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication Presentation Skills.
Practice: **Viva Voce;** Making a Short Speech – Extempore- Making a Presentation:

Exercise – V

CALL Lab:

Understand : **Blog**
Writing *Practice:*
Writing a Blog **ICS Lab:**
Understand: Group Discussion-Purpose; Do's & Don'ts, Parts of a GD-Roles in a GD.
Practice: Group Discussion

Source of Material (Master Copy):

- Exercises in Spoken English. Part 1,2,3. CIEFL and Oxford University Press

Suggested Software:

Cambridge Advanced Learners' English Dictionary with

CD. Grammar Made Easy by Darling Kindersley.

Punctuation Made Easy by Darling Kindersley.

Oxford Advanced Learner's Compass, 10th

Edition.

English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.

English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.

English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.

TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

Digital All

Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

(2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.
Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press
Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient Black Swan Pvt. Ltd.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2404ES61: ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING LAB

B.TECH I YEAR I SEMESTER **L T P C**

0 0 2 1

Course outcomes: Students will be able to:

- Identify various electronic components and their functions in electronic applications.
- Analyze the properties and behavior of different electronic components.
- Measure key electrical parameters using appropriate measuring instruments.
- Analyze and interpret data obtained from electronic measurements for accurate assessment.
- Design and assemble basic electronic circuits using appropriate components.
- Identify faults, test, and validate electronic circuits for proper functionality.

List of Experiments:

1. Understand the significance of Electronics and Communications subjects
2. Identify the different passive and active components
3. Color code of resistors, finding the types and values of capacitors
4. Study of electrical specifications of active and passive components
5. Measure the voltage and current using voltmeter and ammeter
6. Study of Digital Multimeter to Measure the voltage, current, contunity testing, transistor terminals determination
7. Study the CRO and measure the frequency and phase of given signal
8. Draw the various Lissajous figures using CRO
9. Study the function generator for various signal generations
10. Operate Regulated power supply for different supply voltages
11. Study of basic logic gates and verify the Truth Tables
12. Identify various Digital and Analog ICs
13. Study of Electrical Specifications and IC packages of Digital and Analog ICs
14. Implementation of given simple RLC circuit on bread board using suitable components

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400MC01: ENVIRONMENTAL SCIENCE

B.TECH I YEAR I&II SEMESTER **L T P C**
2 0 0 0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Recognize , the significance of natural resources, their classifications. Alternative energy for the sustainability of the environment by appropriate maintance of natural resources.
- Understand the biodiversity & type of biodiversity along with the value &conservation of biodiversity
- Categorize, the type of environmental pollution & various treatment technologies for diminution of environmental pollutants summarize the global environmental issues
- Understand the sustainable development concept & importance of green buildings , EIA, EIS, EMP.

Course Outcomes:

- Understand the scarcity of natural resources and will be able to replace them with alternative energy resources for the sustainability of environmental society & economy
- Recognize the type of biodiversity along the values & conservation biodiversity and know about the bio geographical regions
- Categorize the types of environmental pollution & the various treatment technologies for the diminution of environmental pollutants and contaminants
- Summarize the global environmental issues to create awareness about the international conventions and protocols for extenuating global environmental issues
- Understand the importance of environmental legislation policies, sustainable development and concept of green building
- Analyze the principles of green building design and their impact on environmental conservation.

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Bio geo chemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem

diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wild life, man-wild life conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: **Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution**: Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances(ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXTBOOKS:

1. Text book of Environmental Studies for Under graduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400MC02: FRENCH LANGUAGE

B.TECH I YEAR I&II SEMESTER **L T P C**
2 0 0 0

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:

- To inculcate the basic knowledge of the French language.
- To hone the basic sentence constructions in day to day expressions for communication in their vocation.

Course Outcomes

- Develop the ability to communicate effectively in French at the A1 level.
- Understand and respond to basic spoken French in everyday contexts.
- Read and write simple texts in French with clarity and accuracy.
- Gain a competitive edge in the job market by acquiring French language skills.
- Enhance prospects for higher education in French-speaking countries.
- Develop an appreciation of Francophone culture and its global significance.

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 –er verbs in the present – Possessive adjectives - Qualifying adjectives

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

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time –talk about sports and recreation - express the frequency Writing: A letter to a friend

Grammar - The expression of time – Their verbs in the present - The verbs do, go, take, come, -Adverbs - Reflexive verbs

Vocabulary - The days and months of theyear-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 (Course book) By Livid Language

Ã L' Aventure: An Introduction to French Language and Francophone Cultures byEvelyne Charvier-Berman, Anne C. Cummings.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2400BS02: NUMERICAL TECHNIQUES & VECTOR CALCULUS

B.TECH I YEAR II SEMESTER **L T P C**
3 1 0 4

Course Objectives: To learn

- Apply numerical techniques to find the root of algebraic and transcendental equations
- Apply concept of finite differences and estimate the value for the given data using interpolation.
- Evaluation differentiation and integration by numerical methods.
- The physical quantities involved in engineering field related to vector valued functions.
- Evaluation of multiple integrals and the basic properties of vector valued functions and their applications to line, surface and volume integrals

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

- Find the root of polynomial and transcendental equations and solve linear equations by numerical methods.
- Estimate the value for the given data using interpolation.
- Evaluate numerical differentiation and integration whenever analytical methods are not applicable.
- Find the directional derivatives, Irrotational
- Evaluate Solenoid function and angle between the surfaces.
- Evaluate multiple integrals, line, surface and volume integrals.

UNIT-I: **9 L**

Numerical Solution of Algebraic &Transcendental Equations: Introduction, Bisection Method, Regula Falsi Method,Iteration Method and Newton-Raphson Method. Solving linear system of equations by Jacobi's and Gauss Seidel Iteration method.

UNIT-II: **10 L**

Interpolation: Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-III: **9 L**

Numerical Differentiation & Integration: Numerical differentiation: Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order for first order ODE. Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8th rules.

UNIT – IV: 10 L

Vector Differentiation: Scalar and Vector point functions. Gradient, Divergence and Curl, Directional derivatives, angle between the surfaces, Tangent plane and Normal line. Solenoidal and Irrotational vector, Scalar potential functions, Laplacian operator.

UNIT – V: 10 L

Multiple Integrals &Vector Integration: Evaluation of Double Integrals (Cartesian); Change of order of integration (only Cartesian form); Evaluation of Triple Integrals. Line, Surface and Volume Integrals.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2017.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.
3. M . K Jain, S R K Iyengar, R.K Jain, Numerical Methods for Scientific and Engineering Computation, New age International publishers.

REFERENCE BOOKS:

5. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9thEdition, 2013.
6. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 38th Reprint, 2022.
7. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 9thEdition, Reprint, 2002.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2405ES02: DATA STRUCTURES AND ALGORITHMS

B.TECH I YEAR II SEMESTER **L T P C**
3 0 0 3

Course Objectives:

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, lists trees and graphs.
- To enable them to write algorithms for solving problems with the help of fundamental data Structures

Course Outcomes:

At the end of the course the students are able to:

- Analyze algorithms to determine their time and computational complexity while justifying their correctness.
- Implement and compare search algorithms like Linear Search and Binary Search.
- Implement Stacks, Queues, and Linked Lists, and analyze their time and computational complexity.
- Develop algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, and Heap Sort, comparing their performance in terms of space and time complexity.
- Implement graph search and traversal algorithms and evaluate their efficiency.
- Compare and contrast different algorithms based on their computational efficiency and resource utilization.

UNIT-I

Introduction: Basic Terminologies: Elementary Data Organizations. Data Structure Operations: insertion, deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. **Searching:** Linear Search and Binary Search Techniques implementation using C & Python and their complexity analysis.

UNIT-II

Stacks and Queues using C& Python: **ADT Stack and its operations:** Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. **ADT Queue:** Types of Queue: Simple Queue, Circular Queue, Priority Queue. Double ended Queue and Operations on each types of Queues and Algorithms.
Applications of queues.

UNIT-III

Linked Lists using C&Python: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue. **Doubly Linked List:** operations on it and algorithmic analysis. **Circular Linked List:** all operations on it. Applications of Linked List.

UNIT-IV

Trees using C & Python: Basic Tree Terminologies: Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, **AVL Tree:** Tree operations on each of the trees and their algorithms. Applications of Binary Trees, B-Tree, B+ Tree: definitions and its construction algorithm.

UNIT-V

Sorting and Hashing using C & Python: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort. Performance and Comparison among all the methods, Hashing-hash function, collision resolution methods. **Graphs:** Basic Terminologies & Representations, Applications of a Graph, Graph traversal algorithms .

TEXTBOOKS:

1. Data structures and algorithms in python by Michael T. Goodrich

2. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

1. Hands-On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7, 2nd Edition by Dr. Basant Agarwal, Benjamin Baka.

2. Data Structures and Algorithms with Python by Kent D. Lee and Steve Hubbard.

3. Problem Solving with Algorithms and Data Structures Using Python by Bradley N Miller and David L. Ranum.

4. Core Python Programming -Second Edition,R. Nageswara Rao, Dreamtech **Press**

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2404ES01: ELECTRONIC DEVICES AND CIRCUITS

B.TECH I YEAR II SEMESTER **L T P C**
3 1 0 4

COURSE OBJECTIVES:

The main objectives of the course are:

1. To familiarize the student with the principal of operation, analysis and design of junction diode, BJT and FET transistors and amplifier circuits.
2. To understand diode as a rectifier.
3. To study basic principal of filter of circuits and various types

COURSE OUTCOMES:

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

- Understand and analyze different types of diodes, their operation, and characteristics.
- Design and analyze DC biasing circuits for Bipolar Junction Transistors (BJT) and Field Effect Transistors (FET).
- Design biasing circuits using diodes and transistors for stable operation.
- Analyze and design diode application circuits, including rectifiers and clippers.
- Design and evaluate amplifier circuits using BJT and FET for various applications.
- Analyze and implement oscillator circuits employing BJT and FET devices for signal generation.

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, Resistance levels(static and dynamic), transition and diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes. Qualitative Theory of Zener Diode, volt-ampere characteristics

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

UNIT-II

Rectifiers, Filters: P-N Junction as a rectifier ,Half wave rectifier, Full wave rectifier, Bridge rectifier , Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, π- section filter and comparison of various filters, Voltage regulation using Zener diode.

UNIT-III

Bipolar Junction Transistor: The Junction transistor, Transistor construction, Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

BJT Hybrid Model: h-parameter representation of a transistor, Analysis of single stage transistor

amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_i, R_i ,A_v,and R_o.

UNIT-IV

Transistor Biasing And Stabilisation: Operating point , the D.C and A.C Load lines,Need for biasing , criteria for fixing operating point, B.J.T biasing, Fixed bias, Collector to base bias, Emitter Feedback bias, Self bias techniques for stabilization, Stabilization factors(s, sI, sII), Bias Compensation using diode and transistor(Compensation against variation in VBE, ICO) Thermal run away, Condition for Thermal stability.

UNIT-V

Field Effect Transistor: JFET (Construction, principal of Operation and Volt –Ampere characteristics)-Pinch- off voltage, Small signal model of JFET. FET as Voltage Variable Resistor, Comparison of BJT and FET. MOSFET (Construction, Principle of Operation and symbol), MOSFET characteristics in Enhancement and Depletion modes.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

REFERENCE BOOKS:

1. Electronic Devices and Circuits, K.Lal Kishore B.S Publications
2. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGraw Hill.
3. Electronic Devices and Circuits, Balbir kumar ,shailb.jain, PHI Privated Limted,
4. Electronic Devices and Circuits, A.P Godse, U.A Bakshi , Technical Publications
5. Electronic Devices and Circuits K.S. Srinivasan Anurdha Agencies

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402PC01: ELECTRICAL CIRCUIT ANALYSIS-I

B.TECH I YEAR II SEMESTER **L T P C**
3 0 0 3

Pre-Requisites: Mathematics

Course Objectives:

- To gain knowledge in circuits and to understand the fundamentals of derived circuit laws.
- To learn steady state and transient analysis of single phase and 3-phase circuits.
- To understand Theorems and concepts of coupled circuits.

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

- Apply mesh and node analysis methods to solve electrical circuits.
- Evaluate the steady-state and transient response of electrical circuits under DC and AC excitations.
- Analyze and simplify electrical circuits using various network theorems.
- Understand and apply the concepts of coupled circuits in electrical networks.
- Analyze the transient behavior of RLC circuits and predict their response to different inputs.
- Develop problem-solving skills for analyzing complex electrical networks using systematic approaches.

UNIT-I: Network Elements & Laws: Active elements, Independent and dependent sources. Passive elements — R, L and C, Energy stored in inductance and capacitance, Kirchhoff's laws, Source transformations, Star-delta transformations, Node voltage method, Mesh current method including super node and super mesh analysis.

UNIT-II: Single-Phase Circuits: RMS and average values of periodic sinusoidal and non- sinusoidal waveforms, Phasor representation, Steady-state response of series, parallel and series-parallel circuits. Impedance, Admittance, Current locus diagrams of RL and RC series and parallel circuits with variation of various parameters. Resonance: Series and parallel circuits, Bandwidth and Q-factor.

UNIT-III: Network theorems: Superposition theorem, Thevenin's theorem, Norton's theorems, Maximum power transfer theorem, Tellegen's theorem, Compensation theorem, Milliman's theorem and Reciprocity theorem. (AC & DC).

UNIT-IV: Poly-phase Circuits: Analysis of balanced and unbalanced 3-phase circuits, Star and delta connections, Measurement of three-phase power for balanced and unbalanced loads.

UNIT-V: Coupled circuits: Concept of self and mutual inductance, Dot convention, Coefficient of coupling, Analysis of circuits with mutual inductance. Topological Description of Networks: Graph, tree, chord, cut-set, incident matrix, circuit matrix and cut-set matrix,

TEXTBOOKS:

1. Van Valkenburg M.E, “Network Analysis”, Prentice Hall of India, 3rd Edition, 2000.

2. Ravish R Singh, “Network Analysis and Synthesis”, McGraw Hill, 2nd Edition, 2019.

REFERENCE BOOKS:

1. B. Subramanyam, “Electric Circuit Analysis”, Dreamtech Press & Wiley, 2021.

2. James W.Nilsson, Susan A.Riedel, “Electric Circuits”, Pearson, 11th Edition, 2020.

3. A Sudhakar, ShyamMohan S Palli, “Circuits and Networks: Analysis and Synthesis”, McGraw Hill, 5th Edition, 2017.

4. Jagan N.C, LakshrniNarayana C., “Network Analysis”, B.S. Publications, 3rd Edition, 2014.

5. William Hayt H, Kimmerly Jack E. and Steven Durbin M, “Engineering Circuit Analysis”, McGraw Hill, 6th Edition, 2002.

6. Chakravarthy A., “Circuit Theory”, Dhanpat Rai & Co., First Edition, 1999.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2405ES62: DATA STRUCTURES & ALGORITHMS LAB

B.TECH I YEAR II SEMESTER **L T P C**

0 0 5 2.5

Course Objectives:

- To make the student to implement data structures using python and C programming languages.
- To make the student write ADTS for all data structures.

Course Outcomes:

At the end of the course the students are able to:

- Analyze algorithms to determine their time and computational complexity and justify their correctness.
- Implement and evaluate search algorithms such as Linear Search and Binary Search.
- Implement Stacks, Queues, and Linked Lists and analyze their time and computational complexity.
- Design and implement sorting algorithms like Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, and Heap Sort.
- Compare sorting algorithms based on their space and time complexity for different input sizes.
- Develop problem-solving skills to optimize algorithm efficiency based on computational constraints.

Week 1: Write a C program and Python program to implement the following searching techniques in both recursive and non recursive manner.

i) Linear search ii) Binary Search.

Week 2: Write a C & Python program to implement the following using List and Dictionary.

a) Stack b) Queue

Week 3: Write a C & Python program to implement Linked list data structure and perform the following operations.

a) Insert an element in to a list. b) Delete an element from list

c) Search for a key element in list d) count number of nodes in list.

Week 4: Write a C & Python program to implement the following using a singly linked list.

a) Stack b) Queue

Week 5: Write a C & Python program to implement the Deque (double ended queue)ADT using a List.

Week 6: Write a C& python program to perform the following operations:

a) Insert an element into a binary search tree.

b) Delete an element from a binary search tree.

c) Search for a key element in a binary search tree.

Week 7: Write a C & Python program that uses recursive functions to traverse the given binary search tree in a)Preorder b) inorder and c) postorder.

Week 8: Write a C & Python program to perform the following operations

a) Insertion into aB-tree

b) Deletion from a B-tree

Week 9: Write a C&Python program to construct AVL tree and perform the following operation

a) Insertion into an AVL-tree

Week 10: Write a C & Python program to implement hash table and perform the following operations **a)** Inserting a key**-**value pair b) Deleting a key-value pair

Week 11: Write a C & Python program for implementing the following sorting methods a)Mergesort b) Heapsort

Week 12: Write a C & Python program to implement the following sorting techniques

i)Bubble sort ii) Selection sort

iv) Quick sort iv) Insertion sort

Week 13: Write a C & Python program to implement the Graph Traversal Techniques.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2404ES62: ELECTRONIC DEVICES AND CIRCUITS LAB

B.TECH I YEAR II SEMESTER **L T P C**

0 0 3 1.5

Course Outcomes

- Analyze the characteristics of various diodes and design rectifier circuits for practical applications.
- Implement and evaluate BJT and FET biasing circuits and analyze their amplification properties.
- Construct and test different amplifier circuits, including CE, CB, and CC configurations, and assess their performance.
- Design and analyze oscillator circuits to generate stable waveforms for electronic applications.
- Evaluate the frequency response of amplifiers and understand their impact on signal processing.
- Develop hands-on skills in assembling, testing, and troubleshooting electronic circuits using laboratory equipment.

LIST OF EXPERIMENTS

1. P-N junction diode characteristics
2. Zener diode characteristics and Zener as voltage regulator
3. Half -Wave Rectifier with and without filter
4. Full - Wave Rectifier with and without filter
5. Input and output characteristics of transistor in CB configuration
6. Input and output characteristics of transistor in CE configuration
7. FET Characteristics
8. h-parameters of CE configuration
9. Frequency response of CE amplifier
10. Frequency response of CC amplifier
11. Frequency response of common source FET amplifier
12. UJT CHARACTERISITCS

1. Regulated Power supplies (RPS)	0-30 V
2. CRO's	0-20 MHz
3. Function Generators	0-1 MHz
4. Multimeters	
5. Decade Resistance Boxes / Rheostats	
6. Decade Capacitance Boxes	
7. Ammeters (Analog or Digital)	0-20 μA, 0-50μA, 0-100μA, 0-200μA, 0-10 mA
8. Voltmeters (Analog or Digital)	0-50V, 0-100V, 0-250V
9. Electronic Components	Resistors, Capacitors, BJT's, SCR's, UJTs, FET's,LED's, MOSFET's, Diodes- Ge & Si type, Transistors – NPN, PNP type

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2402PC61: ELECTRICAL CIRCUIT ANALYSIS – I LAB

B.TECH I YEAR II SEMESTER .

L	T	P	C
0	0	2	1

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand network laws and theorems of DC circuits
3. To study and understand the transient response of circuits for dc excitation
4. To study and understand the impedance calculations in circuits

Course Outcomes: After learning the course, the student will be able to

- Analyze and solve electrical circuits using fundamental network laws such as Kirchhoff's laws.
- Apply and evaluate electrical circuits using various network theorems.
- Examine and interpret the transient behavior of electrical circuits under different conditions.
- Analyze AC circuits and determine impedance, reactance, and power factor.
- Evaluate the steady-state behavior of electrical circuits under AC and DC excitations.
- Develop systematic approaches to solving complex electrical circuits using network concepts.

LIST OF EXPERIMENTS

1. Verification Ohm's Law
2. Verification of KVL and KCL
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Superposition theorem
6. Calculations and Verification of Impedance and Current of RL& RC series circuits
7. Calculations and Verification of Impedance and Current of RLC series circuits
8. Verification of Compensation Theorem.
9. Verification of Reciprocity Theorem.
10. Verification of Maximum Power Transfer Theorem.
11. Transient response of RC circuit for DC excitation
12. Transient response of RL circuit for DC excitation

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

NUMERICAL METHODS AND COMPLEX VARIABLES

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

3 1 0 4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

- Expressing periodic function by Fourier series and a non-periodic function by Fourier transforms
- Various numerical methods to find roots of polynomial and transcendental equations.
- Concept of finite differences and to estimate the value for the given data using interpolation.
- Evaluation of integrals using numerical techniques
- Solving ordinary differential equations of first order using numerical techniques.
- Differentiation and integration of complex valued functions.
- Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
- Expansion of complex functions using Taylor's and Laurent's series.

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

- Express any periodic function in terms of sine and cosine
- Find the root of a given polynomial and transcendental equations.
- Estimate the value for the given data using interpolation
- Find the numerical solutions for a given first order ODE's
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
- Taylor's and Laurent's series expansions in complex function

UNIT-I: Fourier Series & Fourier Transforms: 10 L

Fourier series - Dirichlet's Conditions - Half-range Fourier series - Fourier Transforms: Fourier Sine and cosine transforms - Inverse Fourier transforms.

UNIT-II: Numerical Methods-I 10 L

Solution of polynomial and transcendental equations: Bisection method, Iteration Method, Newton- Raphson method and Regula-Falsi method. Jacobi and Gauss-Seidal iteration methods for solving linear systems of equations.

Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-III: Numerical Methods-II **8 L**

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

Ordinary differential equations: Taylor's series, Picard's method, Euler and modified Euler's methods,

Runge-Kutta method of fourth order for first order ODE

UNIT-IV: Complex Differentiation **10 L**

Limit, Continuity and Differentiation of Complex functions. Cauchy-Riemann equations (without proof), Milne- Thomson methods, analytic functions, harmonic functions, finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties. (All theorems without Proofs), Conformal mappings, Mobius transformations.

UNIT-V: Complex Integration: **10 L**

Line integrals, Cauchy's theorem, Cauchy's Integral formula, zeros of analytic functions, singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem.

and their properties. (All theorems without Proofs)

TEXT BOOKS:

- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36^{th} Edition, 2010.
- S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.

REFERENCE BOOKS:

1. M. K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical methods for Scientific and Engineering Computations, New Age International publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9^{th} Edition, John Wiley & Sons, 2006.
3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7^{th} Edition, Mc-Graw Hill, 2004.

ANALOG CIRCUITS

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

3 0 0 3

Pre-requisite: Electronic Devices and Circuits

Course Objectives:

- Learn the concepts of, load line analysis and biasing techniques
- Learn the concepts of high frequency analysis of transistors.
- To give understanding of various types of amplifier circuits
- Learn the concepts of small signal analysis of BJT and FET
- To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

Course Outcomes: Upon completing this course, the students will be able to

1. Analyze various biasing techniques used in amplifier design.
2. Design single-stage amplifiers using both BJT and FET.
3. Examine the characteristics and performance of multistage amplifiers.
4. Understand the concepts of high-frequency analysis of BJT and its implications in amplifier design.
5. Apply the concepts of negative feedback to enhance the stability and performance of amplifiers.
6. Implement positive feedback techniques to achieve sustained oscillations in oscillator 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

Analysis and Design of Small 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, Transistor amplifying action, Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT - II

FET- Biasing Techniques

FET Amplifiers: Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOSFET Amplifiers, MOS Small signal model, Common source amplifier with resistive, Diode connected and Current source loads, Source follower, Common Gate Stage, Cascode and Folded Cascode Amplifier — frequency response.

UNIT - III

Multistage Amplifiers: Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage amplifiers, Cascade

RC Coupled amplifiers, Cascode amplifier, Darlington pair.

Transistor at High Frequency: Hybrid -πmodel of Common Emitter transistor model, fα, fβ and unity gain bandwidth, Gain-bandwidth product.

UNIT – IV

Feedback Amplifiers: Concepts of feedback — Classification of feedback amplifiers — General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems**.**

UNIT - V

Oscillators: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias -Integrated Electronics, McGraw Hill Education.
2. Robert L. Boylestead, Louis Nashelsky -Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson

REFERENCE BOOKS:

David A. Bell – Electronic Devices and Circuits, 5th Edition, Oxford.
Adel S. Sedra, Kenneth C. Smith- Microelectronic Circuits- Theory and Applications, Oxford.
Chinmoy Saha, Arindam Halder, Debaati Ganguly -Basic Electronics-Principles and Applications, 2018, Cambridge.

NETWORK ANALYSIS AND SYNTHESIS

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives:

1. To understand the basic concepts on RLC circuits.
2. To know the behavior of the steady state and transient states in RLC circuits.
3. To understand the two port network parameters.
4. Learn the design concepts of various filters and attenuators

Course Outcomes: Upon successful completion of the course, students will be able to:

1. Understand the fundamental behavior of RLC circuits in different configurations.
2. Analyze the steady-state response of RLC circuits under AC and DC excitations.
3. Evaluate the transient response of RLC circuits for various input conditions.
4. Characterize two-port network parameters and their significance in circuit analysis.
5. Examine the design aspects of different types of filters and their applications.
6. Analyze the working principles and practical implementation of attenuators in signal processing.

UNIT - I

Network Topology: Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT - II

Transient and Steady state analysis: RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. RC Circuits as integrator and differentiators. 2^{nd} order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT - III

Two port network parameters: Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions — using transformed (S) variables, Poles and Zeros. Standard T, □, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network.

UNIT-IV

Filters: Classification of Filters, Filter Networks, Constant-K Filters-Low pass, high pass, Band pass, band-stop filters, M-derived Filters- T and π filters- Low pass, high pass

Attenuators: Types — T, π , L, Bridge T and lattice ,Asymmetrical Attenuators T, π , L Equalizers-Types- Series, Shunt, Constant resistance, bridge T attenuation, bridge T phase, Lattice attenuation, lattice Phase equalizers

UNIT – V

Network Synthesis: Driving point impedance and admittance, transfer impedance and admittance, network functions of Ladder and non ladder networks, Poles, Zeros analysis of network functions**,**Hurwitz polynomials, Positive Real Functions, synthesis of LC, RC and RL Functions by foster and causer methods.

TEXT BOOKS:

1. Van Valkenburg -Network Analysis, 3rd Ed., Pearson, 216.
2. JD Ryder - Networks, Lines and Fields, 2nd Ed., PHI, 1999.

REFERENCE BOOKS:

1. J. Edminister and M. Nahvi - Electric Circuits, Schaum's Outlines, Mc Graw Hills Education, 1999.
1. Sudhakar and Shyammohan S Palli - Networks & Circuits, 4th Ed., Tata McGraw- Hill Publications
2. William Hayt and Jack E. Kimmerley - Engineering Circuit Analysis, 6th Ed., William Hayt and Jack E. Kimmerley, McGraw Hill Company

DIGITAL LOGIC DESIGN

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

3 0 0 3

Course Objectives:

1. To understand common forms of number representation in logic circuits.
2. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
3. To understand the concepts of combinational logic circuits and sequential circuits.
4. To understand the Realization of Logic Gates Using Diodes & Transistors.

Course Outcomes: Upon completing this course, the students will be able to

1. Understand numerical information in different forms and apply Boolean Algebra theorems.
2. Define and apply the postulates of Boolean algebra to simplify combinational functions.
3. Design optimized combinational circuits using logic minimization techniques.
4. Analyze and implement sequential circuits for various cyclic and state-based functions.
5. Characterize different logic families and evaluate their performance based on AC and DC parameters.
6. Compare the advantages and limitations of logic families for selecting appropriate digital circuit implementations.

UNIT - I

Number Systems: Number systems, Complements of Numbers, Codes- Weighted and Non-weighted codes and its Properties, Parity check code and Hamming code.

Boolean algebra: Basic Theorems and Properties, Switching Functions- Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, EX-OR gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT - II

Minimization of Boolean functions: Karnaugh Map Method - Up to five Variables, Don't Care Map
Entries, Tabular Method

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL, CML and CMOS Logic Families and its Comparison, standard TTL NAND Gate-Analysis & characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tri-state outputs,IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT – III

Combinational Logic Circuits: Adders, Subtractors, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders and Code converters, Hazards and Hazard Free Relations.

Sequential Circuits Fundamentals: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops,

Excitation Table of all Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.

UNIT - IV

Registers and Counters: Shift Registers – Left, Right and Bidirectional Shift Registers, Applications of Shift Registers - Design and Operation of Ring and Twisted Ring Counter, Operation of Asynchronous and Synchronous Counters.

Sequential Machines: Finite State Machines, Synthesis of Synchronous Sequential Circuits-Serial Binary Adder, Sequence Detector, Parity-bit Generator, Synchronous Modulo N –Counters.

UNIT – V

Finite state machine: capabilities and limitations, Mealy and Moore models, State equivalence and machine minimization, simplification of incompletely specified machines, Merger graphs. Asynchronous design-modes of operation, Hazards, synthesis of SIC fundamental mode circuits, synthesis of burst mode circuits. Introduction to ASM Charts

TEXT BOOKS

1. Zvi Kohavi &Niraj K. Jha, - Switching and Finite Automata Theory, 3rd Ed., Cambridge, 2010.
2. R. P. Jain - Modern Digital Electronics, 3rd Edition, 2007- Tata McGraw-Hill

REFERENCE BOOKS

1. Morris Mano, Fredriac J. Hill, Gerald R. Peterson - Introduction to Switching Theory and Logic Design –3rd Ed., John Wiley & Sons Inc.
2. Charles H. Roth - Fundamentals of Logic Design, 5th ED., Cengage Learning, 2004.

SIGNALS AND SYSTEMS

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

3 1 0 4

Course Objectives: The objectives of this subject are to:

1. Classify signals and systems and their analysis in time and frequency domains.
2. Study the concepts of distortion less transmission through LTI systems, convolution and correlation properties.
3. Understand Laplace and Z-transforms their properties for analysis of signals and systems.
4. Identify the need for sampling of CT signals, types and merits and demerits of each type.

Course Outcomes: Upon completing this course the students able to:

1. Characterize various signals and systems in both time and frequency domains using transform techniques.
2. Analyze the properties and behavior of systems for signal transmission and physical realizability.
3. Apply the conditions required for the successful transmission of signals through different types of systems.
4. Implement the sampling theorem for baseband and bandpass signals using various sampling techniques and duty cycles.
5. Utilize correlation functions to analyze signal similarity and system behavior in different applications.
6. Apply Power Spectral Density (PSD) functions for signal analysis and noise characterization in practical scenarios.

UNIT - I

Signal Analysis: Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Classification of Signals and systems, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT – II

Fourier series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

UNIT - III

Signal Transmission through Linear Systems: Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filter characteristic of Linear System, Distortion less transmission

through a system, Signal bandwidth, System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and rise time, Convolution and Correlation of Signals, Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution.

UNIT – IV

Laplace Transforms: Laplace Transforms (L.T), Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

UNIT - V

Sampling theorem: Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling — Aliasing, Introduction to Band Pass Sampling.

Correlation: Cross Correlation and Auto Correlation of Functions, Properties of Correlation

Functions, Energy Density Spectrum, Parsevals Theorem, Power Density Spectrum, Relation between Autocorrelation Function and Energy/Power Spectral Density Function, Relation between Convolution and Correlation, Detection of Periodic Signals in the presence of Noise by Correlation, Extraction of Signal from Noise by Filtering.

TEXT BOOKS

1. B.P. Lathi -Signals, Systems & Communications, BSP, 2013.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawabi -Signals and Systems, 2nd Ed., Prentice Hall

REFERENCE BOOKS

1. Simon Haykin and Van Veen, A. Rama Krishna Rao, -Signals and Systems, TMH, 2008.
2. Michel J. Robert - Fundamentals of Signals and Systems, MGH International Edition, 2008.
3. C. L. Philips, J. M. Parr and Eve A. Riskin -Signals, Systems and Transforms, 3rd Ed., PE, 2004.

ANALOG CIRCUITS LABORATORY

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

0 0 2 1

Course Outcomes: Upon completing this course the students will be able to

1. Determine the appropriate Q-point for amplifier design to ensure stable operation.
2. Analyze the characteristics of single-stage amplifiers, including gain, input/output impedance, and efficiency.
3. Evaluate the impact of multistage amplification on frequency response and overall performance.
4. Examine different feedback topologies and their effects on amplifier stability and performance.
5. Design oscillators using positive feedback to achieve sustained oscillations.
6. Compare the advantages and limitations of different amplifier and oscillator configurations for practical applications.

List of Experiments (Twelve experiments to be done):

Verify any twelve experiments in H/W Laboratory

1. Perform an experiment to choose Q-point for a Transistor that operate in active region and observe the effect of external Load resistance on Q-point.
2. Design a Self bias Circuit and determine the Q-point of the Transistor and its Stability factor by both simulation and realization with hardware components.
3. Obtain the I/O Characteristics of CE, CB, CC amplifiers. Calculate h-parameters from the Characteristics.
4. Design and Simulate a Common Drain Amplifier with voltage divider bias and determine the Stability factor.
5. Obtain the Drain and Transfer characteristics of CD, CS amplifiers of JFET. Calculate gm, rd from the Characteristics.
6. By experiment prove that the voltage gain of Emitter Follower Circuit is one.
7. Design a Common Emitter Amplifier with a gain of 30db and Bandwidth of 10KHZ and plot the frequency response practically.
8. Design a two stage RC Coupled amplifier and prove that gain is increased and analyze the effects of coupling capacitance.
9. Practically prove that the Darlington pair has high input impedance.
10. Draw the high frequency response of common emitter transistor amplifier and calculate fα, fβ
11. and gain bandwidth product.
12. Design a cascode amplifier for a given specifications
13. Design four topologies of feedback amplifiers and draw the frequency response of them with and without feedback.
14. Design an RC phase shift oscillator circuit and derive the gain condition for oscillations practically for given frequency.
15. Design a Colpitts oscillator circuit for the given frequency and draw the output waveform.

DIGITAL LOGIC DESIGN LABORATORY

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

0 0 2 1

Course Outcomes: Upon completing this course, the students will be able to

1. **Understand** numerical information in different forms and apply Boolean Algebra theorems for logical operations.
2. **Define** the postulates of Boolean algebra and apply them to simplify combinational logic functions.
3. **Design** and implement combinational circuits using logic minimization techniques.
4. **Analyze** the working principles and applications of sequential circuits for various cyclic functions.
5. **Characterize** different logic families and evaluate their performance based on AC and DC parameters.
6. **Compare** the advantages, limitations, and practical considerations of logic families for digital circuit implementation..

List of Experiments

1. Realization of Logic circuit to generate r's Compliment using Logic Gates.
2. Realization of given Boolean function using universal gates and minimizing the same.Compare the gate count before and after minimization.
3. Design and realize Full Adder circuit using gates/universal gates. Implement Full Subtractor using full adder.
4. Designing a 2 – bit Comparator using AND, OR and NOT gates. Realize 4 – bit Comparator using 2
— bit Comparators.
5. Realize 2:1 MUX using the given gates and Design 8:1 using 2:1 MUX.
6. Implement the given Boolean function using the given MUX(ex: code converters).
7. Realize a 2x4 Decoder using logic gates and implement 3x8 Decoder using 2x4 Decoder.
8. Implement the given Boolean function using given Decoders.
9. Convert Demultiplexer to Decoder and vise versa.
10. Verification of truth tables of flipflops using different clocks (level triggering, positive and negative edge triggering) also converts the given flipflop from one type to other.
11. Designing of Universal n-bit shift register using flipflops and Multiplexers. Draw the timing diagram of the Shift Register.
12. Design a Synchronous binary counter using D-flipflop/given flipflop.
13. Design a asynchronous counter for the given sequence using given flipflops.
14. Designing of MOD 8 Counter using JK flipflops.
15. Designing of sequence detecting State Machine with minimal states using the given flipflops.
16. Designing of Parity Bit(even/odd) generator using the given flipflops.
17. Realize all logic gates with TTL logic.
18. Realize all logic gates with DTL logic.

*Design a sequence detector to detect a given sequence and verify practically

*Design a serial subtractor for 4 bit binary numbers

BASIC SIMULATION LABORATORY

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

0 0 2 1

Course Outcomes: Upon completing this course, the students will be able to

1. Generate and analyze various types of signals and sequences in both time and frequency domains.
2. Perform mathematical operations on signals/sequences and evaluate their transformations.
3. Analyze and characterize continuous and discrete-time systems using time and frequency domain techniques.
4. Understand the concept of sampling and its impact on signal representation and reconstruction.
5. Generate different types of random signals and analyze their statistical properties.
6. Apply concepts of deterministic and random signals for noise removal and other real-time signal processing applications.

Note:

- All the experiments are to be simulated using MATLAB or equivalent software
- Minimum of 15 experiment are to be completed

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon Simulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Verification of Sampling Theorem.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

Major Equipment required for Laboratories:

1. Computer System with latest specifications connected
2. Window Xp or equivalent
3. Simulation software-MAT Lab or any equivalent simulation software

CONSTITUTION OF INDIA

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

3 0 0 0

Course Objectives: Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes: Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
4. Discuss the passage of the Hindu Code Bill of 1956.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.
Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features
Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election

Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

PROBABILITY THEORY AND STOCHASTIC PROCESSES

B.Tech. II Year II Sem. **L T P C**

3 0 0 3

Pre-requisite: Mathematics

Course Objectives:

1. This gives basic understanding of random variables and operations that can be performed on them.
2. To known the Spectral and temporal characteristics of Random Process.
3. To Learn the Basic concepts of Information theory Noise sources and its representation for understanding its characteristics.

Course Outcomes: Upon completing this course, the students will be able to:

1. Perform operations on single and multiple random variables, including addition, multiplication, and statistical analysis.
2. Analyze the spectral and temporal characteristics of random signals, and apply techniques to identify their properties.
3. Characterize Linear Time-Invariant (LTI) systems driven by stationary random processes using Auto-Correlation Functions (ACFs) and Power Spectral Densities (PSDs).
4. Understand the impact of noise in communication systems and its effects on signal quality and performance.
5. Apply the concepts of Information Theory in the context of communication systems, including entropy, capacity, and coding.
6. Evaluate the relationship between noise, signal processing, and information transmission in communication systems, focusing on practical system design.

UNIT - I

Probability & Random Variable: Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events, *Random Variable*-Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT - II

Operations on Single & Multiple Random Variables – Expectations: Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic and Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density — Point Conditioning,

Conditional Distribution and Density — Interval conditioning, Statistical Independence.
Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions. Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT - III

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response — Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT - IV

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

UNIT - V

Noise Sources & Information Theory: Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties. Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law; Trade -off between bandwidth and SNR.

TEXT BOOKS:

1. Peyton Z. Peebles - Probability, Random Variables & Random Signal Principles, 4th Ed, TMH, 2001.
2. Taub and Schilling - Principles of Communication systems, TMH, 2008

REFERENCE BOOKS:

1. Bruce Hajck - Random Processes for Engineers, Cambridge unipress, 2015
2. Athanasios Papoulis and S. Unnikrishna Pillai - Probability, Random Variables and Stochastic Processes, 4th Ed., PHI, 2002.
3. B.P. Lathi - Signals, Systems & Communications, B.S. Publications, 2003.
4. S.P Eugene Xavier -Statistical Theory of Communication, New Age Publications, 2003

ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

B.Tech. II Year II Sem. **L T P C**

3 0 0 3

Pre-requisite: Mathematics

Course Objectives: Upon completing this course, the students will be able to

1. To learn the Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields, and apply them to solve physics and engineering problems.
2. To distinguish between static and time-varying fields, and understand the significance and utility of Maxwell's Equations and Boundary Conditions, and gain ability to provide solutions to communication engineering problems.
3. To study the propagation, reflection and transmission of planewaves inbounded and unbounded media.

Course Outcomes: Upon completing this course, the student able to

1. Understand the basic laws, concepts, and proofs related to electrostatic fields and magnetostatic fields in electromagnetism.
2. Characterize both static and time-varying fields, and establish the corresponding sets of Maxwell's Equations and boundary conditions for different scenarios.
3. Analyze wave equations for electromagnetic waves and classify conductors, dielectrics, and other materials in terms of their electrical properties.
4. Evaluate the characteristics of Uniform Plane Waves (UPW) in different practical media of interest, focusing on their propagation and behavior.
5. Understand and apply the design aspects of transmission lines, including their parameters, configurations, and types (e.g., coaxial, microstrip).
6. Analyze the performance and behavior of transmission lines under various loading conditions, including signal reflection, impedance matching, and signal loss.

UNIT – I

Electrostatics: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Energy Density. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitance — Parallel Plate, Coaxial, Spherical Capacitors.

UNIT – II

Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density,

Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law.

UNIT – III

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Two Equations for Magnetostatic Fields, Maxwell's Two Equations for Electrostatic Fields Maxwell's Equations in Different Forms, Conditions at a Boundary Surface - Dielectric-Dielectric and Dielectric-Conductor Interfaces.

UNIT – IV

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves — Definitions, Relation between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics — Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization.

Reflection and Refraction of Plane Waves — Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

UNIT – V

Transmission Lines: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless / Low Loss Characterization, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.SC and OC Lines, λ/4, λ/2, λ/8 Lines, Reflection Coefficient, VSWR Smith Chart — Configuration and Applications, Single Stub Matching.

TEXT BOOKS:

1. William H. Hayt Jr. and John A. Buck- Engineering Electromagnetics, 8th Ed., McGraw Hill, 2014
2. Matthew N.O. sadiku and S.V. Kulkarni - Principles of Electromagnetics, 6th Ed., Oxford University Press, Aisan Edition, 2015.

REFERENCE BOOKS:

1. JD. Kraus -Electromagnetics with Applications ,5th Ed., TMH
2. Umesh Sinha, Satya Prakashan -Transmission Lines and Networks, (Tech. India Publications), New Delhi, 2001.
3. JD Ryder -Networks, Lines and Fields, 2nd Ed., PHI, 1999

ANALOG AND DIGITAL COMMUNICATIONS

B.Tech. II Year II Semester **L T P C**

3 0 0 3

Prerequisite: Probability theory and Stochastic Processes, Signal and system

1. **Course Objectives:**

1. To develop ability to analyze system requirements of Analog and digital communication systems.
2. To understand the generation, detection of various Analog and digital modulation techniques.
3. To acquire the vortical knowledge of each block in AM, FM transmitters and receivers.
4. To understand the concepts of baseband transmissions.

Course Outcomes: Upon completing this course, the student able to

1. Design and analyze various analog and digital modulation and demodulation techniques, including AM, FM, PM, PSK, QAM, and others.
2. Model the impact of noise in continuous wave modulation techniques, analyzing its effects on signal quality and performance.
3. Implement the concept of a superheterodyne receiver, and apply pulse modulation techniques in different communication systems.
4. Analyze baseband transmission systems, focusing on the design and performance of data transmission over low-frequency channels.
5. Evaluate the performance of various modulation schemes under different noise conditions, including signal-to-noise ratio (SNR) and bit error rate (BER).
6. Design and implement communication systems incorporating modulation, demodulation, and noise filtering to optimize signal transmission and reception.

UNIT - I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super heterodyne

receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM **Pulse Code Modulation:** PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator, Non- Coherent FSK Detector, BPSK- Modulator, Coherent BPSK Detection. Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver,

Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

TEXT BOOKS

1. Simon Haykin -Analog and Digital Communications, John Wiley, 2005.
2. Wayne Tomasi - Electronics Communication Systems-Fundamentals through Advanced, 5th Ed., PHI, 2009.

REFERENCE BOOKS

1. Herbert Taub, Donald L Schilling, Goutam Saha, -Principles of Communication Systems, 3rd Ed., McGraw-Hill, 2008.
2. Dennis Roddy and John Coolean - Electronic Communications, 4th Ed., PEA, 2004
3. George Kennedy and Bernard Davis - Electronics & Communication System, TMH, 2004
4. K. Sam Shanmugam - Analog and Digital Communication, Willey, 2005

LINEAR AND DIGITAL IC APPLICATIONS

B.Tech. II Year II Sem. **L T P C**

3 0 0 3

Course Objectives: The main objectives of the course are:

1. To introduce the basic building blocks of linear integrated circuits.
2. To introduce the theory and applications of Analog multipliers and PLL.
3. To introduce the concept sine waveform generation and introduce some special function ICs.
4. To understand and implement the working of basic digital circuits.

Course Outcomes: Upon completing this course, the students will be able to

1. Understand the operation and applications of operational amplifiers and linear integrated circuits, including their key characteristics and applications.
2. Analyze functional diagrams of IC555 and IC565 and design practical applications using these integrated circuits.
3. Design and implement various data converters, including analog-to-digital and digital-to-analog converters, focusing on their principles and real-world applications.
4. Select appropriate digital integrated circuits based on their characteristics, understanding their advantages and limitations in different circuit designs.
5. Evaluate the performance of operational amplifiers in real-time applications, such as signal processing, filters, and oscillators.
6. Apply knowledge of data converters and digital ICs to design and optimize circuits in communication systems, control systems, and signal processing.

UNIT - I

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation-Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II

Op-Amp, IC-555 & IC565 Applications: Introduction to Active Filters, Characteristics of Bandpass, Bandreject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators — Triangular, Sawtooth, Square Wave, IC555 Timer-Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL-Block Schematic, principle and Applications.

UNIT - III

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs — Parallel

Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV

Combinational Logic ICs: Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT - V

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

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

TEXT BOOKS:

1. Ramakanth A. Gayakwad - Op-Amps & Linear ICs, PHI, 2003.
2. Floydand Jain- Digital Fundamentals, 8th Ed., PearsonEducation,2005.

REFERENCE BOOKS:

1. D. Roy Chowdhury – Linear Integrated Circuits, New Age International(p)Ltd,2nd Ed., 2003.
2. John. F. Wakerly – Digital Design Principles and Practices, 3rdEd., Pearson, ,2009.
3. Salivahana -Linear Integrated Circuits and Applications, TMH, 2008.
4. William D.Stanley- Operational Amplifiers with Linear Integrated Circuits, 4thEd., Pearson Education India, 2009.

ELECTRONIC CIRCUIT ANALYSIS

B.Tech. II Year II Sem. **L T P C**

3 0 0 3

Pre-requisite: Analog Circuits

Course Objectives: Upon completing this course, the student twill be able to

1. Learn the concepts of Power Amplifiers.
2. To give understanding of tuned amplifier circuits
3. Understand various multivibrators using transistors and sweep circuits.

Course Outcomes: Upon completing this course, the student will be able to

1. Design power amplifiers, considering efficiency, stability, and practical applications.
2. Analyze the design of tuned amplifiers and evaluate their frequency response in different operating conditions.
3. Design multivibrator circuits, including astable, monostable, and bistable configurations, for various timing and waveform generation applications.
4. Implement sweep circuits and understand their applications in signal generation and modulation.
5. Utilize the concepts of synchronization in electronic circuits, focusing on timing and frequency control.
6. Apply frequency division and sampling gate techniques in practical systems such as communication, signal processing, and control systems.

UNIT - I

Large Signal Amplifiers: Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class –C and D Amplifiers.

UNIT- II

Tuned Amplifiers: Introduction, single Tuned Amplifiers — Q-factor, frequency response, Double Tuned Amplifiers — Q-factor, frequency response, Concept of stagger tuning and synchronous tuning

UNIT - III

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

UNIT - IV

Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement.

UNIT - V

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuits, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias - Integrated Electronics, , McGraw Hill Education.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008,

REFERENCE BOOKS:

1. David A. Bell - Electronic Devices and Circuits, 5th Ed., Oxford.
2. Robert L. Boylestead, Louis Nashelsky - Electronic Devices and Circuits theory, 11th Ed., Pearson, 2009
3. Ronald J. Tocci - Fundamentals of Pulse and Digital Circuits, 3rd Ed., 2008.
4. David A. Bell - Pulse, Switching and Digital Circuits, 5th Ed., Oxford, 2015.

ANALOG AND DIGITAL COMMUNICATIONS LABARATORY

B.Tech. II Year II Sem.

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Note:

- Minimum 12 experiments should be conducted:
- All these experiments are to be simulated first either using MATLAB, COMSIM or any other simulation package and then to be realized in hardware

Course Outcomes: Upon completing this course, the student able to:

1. Design and implement various analog modulation and demodulation techniques (AM, FM, PM), and analyze their time and frequency domain characteristics.
2. Design and implement pulse modulation and demodulation techniques (PWM, PPM, PCM), and observe their time and frequency domain characteristics.
3. Apply different types of sampling techniques, evaluating the effects of various sampling rates and duty cycles on signal accuracy and performance.
4. Design and implement various digital modulation and demodulation techniques (ASK, FSK, PSK, QAM), and observe their waveform characteristics in practical applications.
5. Evaluate the performance of modulation techniques in the presence of noise and distortion, analyzing their robustness in real-world scenarios.
6. Conduct practical experiments to observe and measure the performance of modulated signals, and compare theoretical predictions with actual results.

List of Experiments:

1. Amplitude modulation and demodulation (ii) Spectrum analysis of AM
   (i) Frequency modulation and demodulation (ii) Spectrum analysis of FM
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency Division Multiplexing & De multiplexing
5. Pulse Amplitude Modulation & Demodulation
6. Pulse Width Modulation & Demodulation
7. Pulse Position Modulation & Demodulation
8. PCM Generation and Detection
9. Delta Modulation
10. DPCM Generation and Detection
11. Frequency Shift Keying: Generation and Detection
12. Binary Phase Shift Keying: Generation and Detection
13. Generation and Detection (i) DPSK (ii) QPSK
14. Generate FSK modulated signal using PLL

LINEAR AND DIGITAL IC APPLICATIONS LABORATORY

B.Tech. II Year II Semester **L T P C**

0 0 2 1

Course Outcomes: Upon completing this course, the student able to

1. Design and implement various analog circuits using 741 operational amplifier ICs, focusing on amplifiers, filters, and oscillators.
2. Design and implement various multivibrator circuits (astable, monostable, and bistable) using the 555 timer IC for applications like pulse generation and timing.
3. Design and implement various digital circuits using digital ICs (e.g., logic gates, flip-flops, counters) for combinational and sequential logic applications.
4. Design and implement analog-to-digital converters (ADC), digital-to-analog converters (DAC), and voltage regulator circuits for power supply and signal conversion applications.
5. Evaluate the performance and efficiency of analog and digital circuits, focusing on parameters such as gain, stability, and power consumption.
6. Analyze and troubleshoot circuit designs for proper functionality and optimization in real-world applications.

Note:

- Minimum 12 experiments should be conducted.
- Verify the functionality of the IC in the given application.

Design and Implementation of:

1. Design an Inverting and Non-inverting Amplifier using Op Amp and calculate gain.
2. Design Adder and Subtractor using Op Amp and verify addition and subtraction process.
3. Design a Comparator using Op Amp and draw the comparison results of A=B, A<B, A>B.
4. Design a Integrator and Differentiator Circuits using IC741 and derive the required condition practically.
5. Design a Active LPF, HPF cutoff frequency of 2 KHZ and find the roll off of it.
6. Design a Circuit using IC741 to generate sine/square/triangular wave with period of 1KHZ and draw the output waveform.
7. Construct Mono-stableMultivibratorusingIC555 and draw its output waveform.
8. Construct Astable Multivibrator using IC555 and draw its output waveform and also find its duty cycle.
9. Design a Schmitt Trigger Circuit and find its LTP and UTP.
10. Design Frequency modulator and demodulator circuit and draw the respective waveforms.
11. Design VoltageRegulatorusingIC723, IC 7805/7809/7912 and find its load regulation factor.
12. Design R-2R ladder DAC and find its resolution and write a truth table with respective voltages.
13. Design Parallel comparator type/ counter type/ successive approximation ADC and find its efficiency.
14. Design a Gray code converter and verify its truth table.
15. Design an even priority encoder using IC 74xx and verify its truth table.
16. Design a 8x1 multiplexer using digital ICs.

17. Design a 4-bit Adder/Subtractor using digital ICs and Add/Sub the following bits.

(i)	(ii)	(iii)
1010	0101	1011
0100	0010	1001.

18. Design a Decade counter and verify its truth table and draw respective waveforms.
19. Design a Up/down counter usingIC74163 and draw read/write waveforms.
20. Design a Universal shift register using IC 74194/195 and verify its shifting operation.
21. Design a 16x4 RAM using 74189 and draw its read/write operation.
22. Design a 8x3 encoder/3x8 decoder and verify its truth table.

ELECTRONIC CIRCUIT ANALYSIS LABARATORY

B.Tech. II Year II Sem. **L T P C**

0 0 2 1

Note:

Experiments marked with * has to be designed, simulated and verified in hardware.
Minimum of 9 experiments to be done in hardware.
Course Outcomes: Upon completing this course, the students will be able to

1. Design power amplifiers and analyze their efficiency, considering factors like gain, linearity, and power consumption.
2. Design tuned amplifiers and calculate their Q-factor, analyzing frequency response and resonance characteristics.
3. Design various types of multivibrator circuits (astable, monostable, bistable) and sweep circuits, emphasizing the importance of linearity in signal generation.
4. Understand and implement the design of sampling gates, focusing on their role in controlling signal flow and sampling accuracy.
5. Apply frequency division techniques to split signals into lower frequencies for multiplexing and other applications.
6. Evaluate the performance of sampling gates and frequency division systems in real-world applications, ensuring synchronization and signal integrity.

Hardware Testing in Laboratory:

1. Design transformer coupled class A power amplifier and draw the input and output waveforms find its efficiency
2. Design class B power amplifier and draw the input and output waveforms, find 2^{nd} order and above harmonics.
3. Prove that the complementary symmetry pushpull amplifier eliminate cross over distortion.
4. Design class C power amplifier and draw the input and output waveforms
5. Design a single tuned amplifier and determine the Q of its tuned circuit practically.
6. Design a Bistable Multivibrator and analyze the effect of commutating capacitors and draw the wave forms at base and collector of transistors.
7. Design an Astable Multivibrator and draw the wave forms at base and collector of transistors.
8. Design a Monostable Multivibrator and draw the input and output waveforms
9. Draw the response of Schmitt trigger for gain of greater than and less than one.
10. Design a Bootstrap sweep circuit using BJT and draw its output time base waveform
11. Design a Miller sweep circuit using BJT and draw its output time base waveform.
12. Design a constant current sweep generator and draw input and output waveforms
13. Design unidirectional and bidirectional sampling gates
14. Prove practically Schmitt Trigger generates square wave
15. Frequency division with sweep circuit

GENDER SENSITIZATION LAB

B.Tech. II Year II Sem. **L T P C**

0 0 20

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines — such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies — to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course

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

Learning Outcomes

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

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men

- Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Sharethe Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.
-Gender Development Issues-Gender, Governance and Sustainable Development- Gender andHuman Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve- teasing- Coping withEveryday Harassment- Further Reading: "*Chupulu"*.

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. RebuildingLives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender andPopular Literature - Just Relationships: Being Together as Equals

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

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

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".***

ESSENTIAL READING: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%