

**COURSE STRUCTURE AND DETAILED SYLLABI FOR
FOUR YEARS B. TECH
UNDER ACADEMIC REGULATIONS R23**

FOR

B. Tech Regular (Full-Time) Four Year Degree Courses
(For the Batches Admitted from 2023-2024)

&

B. Tech (Lateral Entry Scheme)
(For the Batches Admitted From 2024-2025)

**COMPUTER SCIENCE AND ENGINEERING
(INTERNET OF THINGS)**



**SRI VENKATESWARA COLLEGE OF ENGINEERING AND
TECHNOLOGY (AUTONOMOUS)**

Accredited by NBA, New Delhi & NAAC A⁺, Bengaluru | Affiliated to JNTUA, Ananthapuramu,

Recognized by the UGC under Section 12(B) and 12(F) | Approved by AICTE, New Delhi.

R.V.S. NAGAR, TIRUPATI ROAD, CHITTOOR – 517127 (A.P) – INDIA

Website: www.svcetedu.org

E-mail: hodcse@svcetedu.org

B.TECH. - COURSE STRUCTURE – R23
(Applicable from the academic year 2023-24 onwards)

INDUCTION PROGRAMME

| S. No. | Course Name | Category | L-T-P-C |
|---------------|---|-----------------|----------------|
| 1 | Physical Activities -- Sports, Yoga and Meditation, Plantation | MC | 0-0-6-0 |
| 2 | Career Counselling | MC | 2-0-2-0 |
| 3 | Orientation to all branches -- career options, tools, etc. | MC | 3-0-0-0 |
| 4 | Orientation on admitted Branch -- corresponding labs, tools and platforms | EC | 2-0-3-0 |
| 5 | Proficiency Modules & Productivity Tools | ES | 2-1-2-0 |
| 6 | Assessment on basic aptitude and mathematical skills | MC | 2-0-3-0 |
| 7 | Remedial Training in Foundation Courses | MC | 2-1-2-0 |
| 8 | Human Values & Professional Ethics | MC | 3-0-0-0 |
| 9 | Communication Skills -- focus on Listening, Speaking, Reading, Writing skills | BS | 2-1-2-0 |
| 10 | Concepts of Programming | ES | 2-0-2-0 |



**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (IOT)**

Course Structure and Scheme of Examination

I B. Tech I Semester – CSE (IOT)

Regulations: R23

| S. No | Category | Course Code | Course Name | Hours/week | | | Credits | Scheme of Examination Maximum Marks | | |
|--------------|----------|-------------|---|------------|----------|-----------|-------------|--|------------|-------------|
| | | | | L/D | T | P | | C | CIA | SEE |
| 1. | BS&H | 23AHS05 | Engineering Physics | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 2. | BS&H | 23AHS04 | Linear Algebra and calculus | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3. | PC | 23ACS01 | Introduction to programming | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4. | ES | 23AEE01 | Basic Electrical and Electronics Engineering | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5. | ES | 23AME01 | Engineering Graphics | 2 | 0 | 2 | 3 | 30 | 70 | 100 |
| 6. | ES | 23AEE02 | Electrical and Electronics Engineering Workshop | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 7. | ES | 23AIT01 | IT Workshop | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 8. | BS&H | 23AHS09 | Engineering Physics Lab | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 9. | PC | 23ACS02 | Computer Programming Lab | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 10 | MC | 23AHS10 | Health and Wellness, Yoga and Sports | 0 | 0 | 1 | 0.5 | 100 | 00 | 100 |
| TOTAL | | | | 14 | 0 | 13 | 20.5 | 370 | 630 | 1000 |

I B. Tech II Semester – CSE (IOT)

Regulations : R23

| S. No | Category | Course Code | Course Name | Hours/week | | | Credits | Scheme of Examination Maximum Marks | | |
|--------------|----------|-------------|---|------------|----------|-----------|-------------|--|------------|-------------|
| | | | | L/D | T | P | | C | CIA | SEE |
| 1. | BS&H | 23AHS01 | Communicative English | 2 | 0 | 0 | 2 | 30 | 70 | 100 |
| 2. | BS&H | 23AHS02 | Chemistry | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3. | ES | 23AHS11 | Differential Equations and vector calculus | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4. | ES | 23ACE01 | Basic Civil and Mechanical Engineering | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5. | PC | 23ACS03 | Data Structures | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 6. | ES | 23AME02 | Engineering Workshop | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 7. | BS&H | 23AHS06 | Communicative English Lab | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 8. | BS&H | 23AHS07 | Engineering Chemistry Lab | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 9. | PC | 23ACS04 | Data Structures Lab | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 10. | MC | 23AHS12 | NSS/NCC/Scouts and Guides / Community Service | 0 | 0 | 1 | 0.5 | 100 | 00 | 100 |
| TOTAL | | | | 14 | 0 | 11 | 19.5 | 370 | 630 | 1000 |

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

I B. Tech I Semester (Common to EEE, ECE, IT, CAI, CSO, CSC, EBM & CSBS)

I B. Tech II Semester (Common to CE, ME, CSE, CSE (DS) & CSE(AI & ML))

| | | | |
|----------|----------|----------|----------|
| L | T | P | C |
| 3 | 0 | 0 | 3 |

23AHS05 ENGINEERING PHYSICS

COURSE OBJECTIVES

1. Bridging the gap between the Physics in school at 10+2 level and UG level engineering courses.
2. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
3. Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law – Learning the structural analysis through X-ray diffraction techniques.
4. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of de Broglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals.
5. To Understand the Physics of Semiconductors and their working mechanism, Concepts utilization of transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.
6. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.

COURSE OUTCOMES

- a. **CO1: Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** the applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)
- b. **CO2: Interpret** various crystal systems (L2) and **Analyze** the characterization of materials by XRD (L4). **Identify** the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique (L3). **Analysis** of structure of the crystals by Laue's method (L2).
- c. **CO3: Describe** the dual nature of matter (L1). **Explain** the significance of wave function (L2). **Identify** the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). **Identify** the role of classical and quantum free electron theory in the study of electrical conductivity (L3).
- d. **CO4: Classify** the crystalline solids (L2). **Outline** the properties of charge carriers in semiconductors (L2). **Identify** the type of semiconductor using Hall effect (L2). **Classify** superconductors based on Meissner's effect (L2). **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2).
- e. **CO5: Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Clausius-Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility (L2).

Unit-I: Wave Optics

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates.

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|-----|----------|----------|----------|----------|----------|--|--|--|----------|--|----------|----------|
| CO2 | 3 | 3 | 1 | | | | | | | | | |
| CO3 | 3 | 2 | 1 | 2 | | | | | | | | |
| CO4 | 3 | 3 | 1 | 2 | 1 | | | | 1 | | 1 | 1 |
| CO5 | 3 | 2 | 2 | | 1 | | | | 2 | | 1 | 1 |

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

I B.Tech I Semester (Common to All Branches)

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23AHS04 LINEAR ALGEBRA & CALCULUS

Course Objectives:

- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

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

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.

CO2: Utilize mean value theorems to real life problems.

CO3: Familiarize with functions of several variables which is useful in optimization.

CO4: Learn important tools of calculus in higher dimensions.

CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT I Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II Eigenvalues, Eigenvectors and Orthogonal Transformation

Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III Calculus

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV Partial differentiation and Applications (Multi variable calculus)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT V Multiple Integrals (Multi variable Calculus)

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, , Pearson publishers, 9th edition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications, 2014, Third Edition (Reprint 2021)

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

**I B.Tech I Semester ,CSE
(Common to all branches)**

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23ACS01: INTRODUCTION TO PROGRAMMING

Course Objectives:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.

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

1. Understand basics of computers, the concept of algorithm and algorithmic thinking.
2. Develop the ability to analyze a problem, develop an algorithm to solve it.
3. Proficiently use the C programming language to implement various algorithms.
4. Understand more advanced features of C language.
5. Develop problem-solving skills and the ability to debug and optimize the code.

UNIT I Introduction to Programming and Problem Solving

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts (Using Dia Tool), pseudo code.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies : Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

Overview of C: History Of C, Basic Structure of C Program, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

UNIT II Control Structures

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do- while) Break and Continue.

UNIT III Arrays and Strings

Definition of Arrays, Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Multidimensional Arrays, Introduction to Strings, operations on strings

UNIT IV Functions

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Recursion.

UNIT V User Defined Data types, File Handling, Pointers

User-defined data types-Structures- Introduction, Nested Structures, Array of Structures, Structures and Functions, and Unions, pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers. Operations on file handling Self-Referential structures, Linked List (creation and display)

Text Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
2. Problem solving with C, M.T.Somashekara, PHI
3. "The C Programming Language" by Brian W. Kernighan and Dennis M. Ritchie
4. Schaum's Outline of Programming with C by Byron S Gottfried (1996), McGraw-Hill Education (ISBN:978-0070240353)

Reference Books:

1. Balagurusamy, E. (2008). Computing fundamentals and C Programming. McGraw-Hill Education.
2. Programming in C Rema Theraja-2nd edition 2016
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
4. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY,
(AUTONOMOUS)**

I B.Tech I Semester

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**23AEE01 BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to All branches of Engineering)**

COURSE OBJECTIVES

To expose to the field of Electrical & Electronics Engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I DC & AC Circuits

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

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT III Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

COURSE OUTCOMES:

After the completion of the course students will be able to

CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.

CO2: Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations.

CO3: Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.

CO4: Analyze different electrical circuits, performance of machines and measuring instruments.

CO5: Evaluate different circuit configurations, Machine performance and Power systems operation

Text Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017

4. Basic Electrical and Electronics Engineering, S. K. Bhattacharya, Person Publications, 2018, Second Edition.

Web Resources:

1. <https://nptel.ac.in/courses/108105053>
2. <https://nptel.ac.in/courses/108108076>

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(Common to All branches of Engineering)

23AME01 ENGINEERING GRAPHICS

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

CO1: Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.

CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.

CO3: Understand and draw projection of solids in various positions in first quadrant.

CO4: Explain principles behind development of surfaces.

CO5: Prepare isometric and perspective sections of simple solids.

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.

Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involute, Normal and tangent to Curves.

Scales: Plain scales, diagonal scales and vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes.

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using AutoCAD (Not for end examination).

Note: The practice will be carried out by using AutoCAD software.

Text Books:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, TataMcGraw Hill, 2017.

23AEE02 ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Course Objectives:

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc. Provide some exercises so that hardware tools and instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
3. Provide some exercises so that measuring instruments are learned to be used by the students.
4. Components:
5. Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
6. Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. -Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Note: Minimum Six Experiments to be performed.

COURSE OUTCOMES:

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

Course Outcomes:

CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.

CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.

CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.

CO4: Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.

CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

I B.Tech I Semester

23AIT01 IT WORKSHOP

(Common to all branches)

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Course Objectives

1. To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
2. To teach basic command line interface commands on Linux.
3. To teach the usage of Internet for productivity and self-paced life-long learning
4. To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

Course Outcomes:

1. Perform Hardware troubleshooting.
2. Understand Hardware components and inter dependencies.
3. Safeguard computer systems from viruses/worms.
4. Document/ Presentation preparation.
5. Perform calculations using spreadsheets.

PC HARDWARE

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content. Differentiate RAM & ROM.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

INTERNET & WORLD WIDE WEB

Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1: Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word

Processors, Details of the four tasks and features that would be covered in each, Using La TeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

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

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting Power point

LOOKUP/VLOOKUP

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Code Generation: Test the model's ability to generate code by giving it partial code snippets and asking it to complete them. You can also ask the model to explain programming concepts or help you debug code.

- Ex: Prompt: "Complete the following Python code to swap the values of two variables:"

\npython\na = 5\nb = 10\ntemp = a\na = b\nb = temp\n"

Task 4: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Task 5: Summarization: Provide a long piece of text, such as an article or a blog post, and ask the model to summarize it. Compare the model's summary with the original text to assess its ability to condense information effectively.

- Ex: Prompt: "Summarize the article titled 'Ramayanam' in 3-4 sentences."

Task 6: Futuristic Predictions: Have fun by asking the model to predict future technological advancements, societal changes, or even hypothetical scenarios. Compare its responses with your own ideas.

- Ex: Prompt: "Predict how artificial intelligence will transform everyday life in the next 20 years."

Task 7: Technical Explanations: Challenge the model with technical questions from different domains. Ask it to explain scientific concepts, mathematical theorems, or complex algorithms in simple terms.

- Ex: Prompt: "Explain the concept of neural networks in machine learning, including their layers and the process of backpropagation."

Reference Books:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech.
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dream tech.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft).

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

I B.Tech I Semester (Common to EEE, ECE, IT, CAI, CSO, CSC, EBM & CSBS)

I B.Tech II Semester (Common to CE, ME, CSE, CSE(DS) & CSE(AI & ML))

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23AHS09 ENGINEERING PHYSICS LAB

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

(Any **TEN** of the following listed experiments)

List of Engineering Physics Experiments

1. Determination of radius of curvature of a given plano convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Determination of dispersive power of prism.
4. Verification of Brewster's law
5. Determination of the resistivity of semiconductor by four probe method.
6. Determination of energy gap of a semiconductor using p-n junction diode.
7. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
8. Determination of dielectric constant using charging and discharging method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method.
11. Determination of wavelength of Laser light using diffraction grating.
12. Estimation of Planck's constant using photoelectric effect.
13. Determination of temperature coefficients of a thermistor.
14. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Course Outcomes:

The students will be able to

- **Operate** optical instruments like microscope and spectrometer
- **Estimate** the wavelength of different colors using diffraction grating and resolving power
- **Plot** the intensity of the magnetic field of circular coil carrying current with distance
- **Determine** the resistivity of the given semiconductor using four probe method
- **Identify** the type of semiconductor i.e., n-type or p-type using hall effect
- **Calculate** the band gap of a given semiconductor

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| CO3 | 3 | 1 | | 2 | | | | | | | | |
| CO4 | 3 | 3 | | 3 | 2 | | | | | | 1 | 1 |

References: 1. S. Balasubramanian, M.N. Srinivasan “A Text book of Practical Physics”- S.Chand Publishers, 2017.

URL:www.vlab.co.in

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
I B.Tech I Semester
(Common to all branches)**

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23ACS02: COMPUTER PROGRAMMING LAB

Course Objectives:

1. To use basic data types, operators, expressions and expression evaluation mechanisms using C Programming Language.
2. To implement control flows, construct in C Programming Language and understand the syntax, semantics and usability contexts of these different constructs.
3. To develop composite data types in C and constructs available to develop their datatypes, utilize them to model things and dealing with data from and to external files.
4. To design programs with different variations of the constructs available for practicing modular programming and understand the pros and cons of using different variants and apply optimization.

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

1. Read, understand and trace the execution of programs written in C language.
2. Select the right control structure for solving the problem.
3. Develop C programs which utilize the memory efficiently using programming constructs like pointers.
4. Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

List of Experiments:

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.

Familiarization with programming environment

- i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
- ii) Exposure to Turbo C, gcc
- iii) Writing simple programs using printf(), scanf()

WEEK 2

Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:

Tutorial 2: Problem-solving using Algorithms and Flow charts.

Converting algorithms/flow charts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

- i) Sum and average of 3 numbers
- ii) Conversion of Fahrenheit to Celsius and vice versa
- iii) Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Simple computational problems using arithmetic expressions.

- i) Finding the square root of a given number
- ii) Finding compound interest
- iii) Area of a triangle using heron's formulae
- iv) Distance travelled by an object

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial 4: Operators and the precedence and as associativity:

Simple computational problems using the operator' precedence and associativity

- i) Evaluate the following expressions.
 - a. $A+B*C+(D*E) + F*G$
 - b. $A/B*C-B+A*D/3$
 - c. $A+++B---A$
 - d. $J= (i++) + (++i)$
- ii) Find the maximum of three numbers using conditional operator
- iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5

Objective: Explore the full scope of different variants of "if construct" namely if-else, null- else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Problems involving if-then-else structures.

- i) Write a C program to find the max and min of four numbers using if-else.
- ii) Write a C program to generate electricity bill.
- iii) Find the roots of the quadratic equation.
- iv) Write a C program to simulate a calculator using switch case.
- v) Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Iterative problems e.g., the sum of series

- i) Find the factorial of given number using any loop.
- ii) Find the given number is a prime or not.
- iii) Compute sine and cos series
- iv) Checking a number palindrome
- v) Construct a pyramid of numbers.

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

D Array manipulation, linear search

- i) Find the min and max of a 1-D integer array.
- ii) Perform linear search on 1D array.
- iii) The reverse of a 1D integer array
- iv) Find 2's complement of the given binary number.
- v) Eliminate duplicate elements in an array.

WEEK 8:

Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:

Tutorial 8: 2 D arrays, sorting and Strings.

Matrix problems, String operations, Bubble sort

- i) Addition of two matrices
- ii) Multiplication two matrices
- iii) Sort array elements using bubble sort
- iv) Concatenate two strings without built-in functions
- v) Reverse a string using built-in and without built-in string functions

WEEK 9:

Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:

Tutorial 9: Functions, call by value, scope and extent,

Simple functions using call by value, solving differential equations using Eulers theorem

- i) Write a C function to calculate NCR value
- ii) Write a C function to find the length of a string
- iii) Write a C function to transpose of a matrix
- iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 10:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:

Tutorial 10: Recursion, the structure of recursive calls

Recursive functions

- i) Write a recursive function to generate Fibonacci series
- ii) Write a recursive function to find the lcm of two numbers
- iii) Write a recursive function to find the factorial of a number
- iv) Write a C Program to implement Ackermann function using recursion
- v) Write a recursive function to find the sum of series.

WEEK 11:

Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:**Tutorial 11:** Call by reference, dangling pointers

Simple functions using Call by reference, Dangling pointers

- i) Write a C program to swap two numbers using call by reference
- ii) Demonstrate Dangling pointer problem using a C program
- iii) Write a C program to copy one string into another using pointer
- iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK12:**Objective:** Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C**Suggested Experiments/Activities:****Tutorial 12:** Pointers, structures and dynamic memory allocation Pointers and structures, memory dereference.

- i) Write a C program to find the sum of a 1D array using malloc()
- ii) Write a C program to find the total, average of n students using structures
- iii) Enter n students data using calloc() and display failed students list
- iv) Read student name and marks from the command line and display the student details along with the total.
- v) Write a C program to implement realloc()

WEEK 13:**Objective:** Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures**Suggested Experiments/Activities:****Tutorial 13:** Bitfields, Self-Referential Structures, Linked lists Bitfields, linked lists

Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

- i) Create and display a singly linked list using self-referential structure.
- ii) Demonstrate the differences between structures and unions using a C program.
- iii) Write a C program to shift/rotate using bitfields.
- iv) Write a C program to copy one structure variable to another structure of the same type.

WEEK14:**Objective:** To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.**Suggested Experiments/Activities:****Tutorial 14:** File handling

File operations

- i) Write a C program to write and read text into a file.
- ii) Write a C program to write and read text into a binary file using fread() and fwrite()
- iii) Copy the contents of one file to another file.
- iv) Write a C program to merge two files into the third file using command-line arguments.
- v) Find no. of lines, words and characters in a file
- vi) Write a C program to print last n characters of a given file.

Text Books

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw Hill

Reference Books

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

I B.Tech I Semester (Common to CSE, CSD, CSM, CE & ME)

I B.Tech II Semester (Common to ECE, EEE, CSC, IT, CAI, CSO, CSBS & EBM)

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23AHS01- COMMUNICATIVE ENGLISH

Course Objectives:

The main objective of introducing this course, *Communicative English*, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes:

CO1: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.

CO2: Apply grammatical structures to formulate sentences and correct word forms.

CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.

CO4: Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.

CO5: Create a coherent paragraph, essay, and resume.

UNIT I

Lesson : **HUMAN VALUES: Gift of Magi (Short Story)**

Listening : Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking : Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading : Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Writing : Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.

Grammar : Parts of Speech, Basic Sentence Structures-forming questions

Vocabulary : Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II

Lesson : **NATURE: The Brook by Alfred Tennyson (Poem)**

Listening : Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking : Discussion in pairs/small groups on specific topics followed by short structure talks.

Reading : Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing : Structure of a paragraph - Paragraph writing (specific topics)

Grammar : Cohesive devices - linkers, use of articles and zero article; prepositions.

Vocabulary : Homonyms, Homophones, Homographs.

UNIT III

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| Lesson | : BIOGRAPHY: Elon Musk |
| Listening | : Listening for global comprehension and summarizing what is listened to. |
| Speaking | : Discussing specific topics in pairs or small groups and reporting what is discussed |
| Reading | : Reading a text in detail by making basic inferences -recognizing and Interpreting specific context clues; strategies to use text clues for comprehension. |
| Writing | : Summarizing, Note-making, paraphrasing |
| Grammar | : Verbs - tenses; subject-verb agreement; Compound words, Collocations |
| Vocabulary | : Compound words, Collocations |

UNIT IV

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| Lesson | : INSPIRATION: The Toys of Peace by Saki |
| Listening | : Making predictions while listening to conversations/ transactional dialogues without video; listening with video. |
| Speaking | : Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. |
| Reading | : Studying the use of graphic elements in texts to convey information, reveal Trends / patterns/relationships, communicate processes or display complicated data. |
| Writing | : Letter Writing: Official Letters, Resumes |
| Grammar | : Reporting verbs, Direct & Indirect speech, Active & Passive Voice |
| Vocabulary | : Words often confused, Jargons |

UNIT V

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| Lesson | : MOTIVATION: The Power of Intrapersonal Communication (An Essay) |
| Listening | : Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. |
| Speaking | : Formal oral presentations on topics from academic contexts |
| Reading | : Reading comprehension. |
| Writing | : Critical Writing - Writing structured essays on specific topics. |
| Grammar | : Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement) |
| Vocabulary | : Technical Jargons |

Text books:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, OrientBlack Swan, 2023 (Units 1,2 & 3)
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:

GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. <https://dictionary.cambridge.org/grammar/british-grammar/>
3. www.eslpod.com/index.html
4. <https://www.learngrammar.net/>
5. <https://english4today.com/english-grammar-online-with-quizzes/>
6. <https://www.talkenglish.com/grammar/grammar.aspx>

VOCABULARY

1. <https://www.youtube.com/c/DailyVideoVocabulary/videos>
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

**I B.Tech I SEM (Common to CSE, CSD & CSM)
II SEM (Common to EEE, ECE, EBM, CAI, CSO, CSC & IT)**

23AHS02

CHEMISTRY

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Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches.

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

CO1: Compare the materials of construction for battery and electrochemical sensors.

CO2: Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.

CO3: Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.

CO4: Apply the principle of Band diagrams in the application of conductors and semiconductors.

CO5: Summarize the concepts of Instrumental methods.

UNIT I Structure and Bonding Models:

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O₂ and CO, etc. π -molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II Modern Engineering materials:

Semiconductors – Introduction, basic concept, application

Super conductors-Introduction, basic concept, applications.

Supercapacitors: Introduction, Basic Concept - Classification – Applications.

Nanomaterials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphenes nanoparticles.

UNIT III Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT IV Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications.

Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT V Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

I B.Tech II Semester (Common to All Branches)

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23AHS11 DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

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

CO1: Solve the differential equations related to various engineering fields.

CO2: Identify solution methods for partial differential equations that model physical processes.

CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence.

CO4: Estimate the work done against a field, circulation and flux using vector calculus.

UNIT I Differential equations of first order and first degree

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits- Orthogonal trajectories.

UNIT II Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT III Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT IV Vector differentiation

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions- Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT V Vector integration

Line integral -Circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. R Ramana, , McGraw Hill Education, 2017

**SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

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I B.Tech - I Semester (Common to All Branches)

23ACE01 BASIC CIVIL AND MECHANICAL ENGINEERING

Course Outcomes: On completion of the course, the student should be able to:

1. Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
2. Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
3. Realize the importance of Transportation in nation's economy and the engineering measures related to highways in terms of geometrics.
4. Understand the importance of water resources and storage structures so that the social responsibilities of water conservation will be appreciated.
5. Understand the different manufacturing processes and explain the basics of thermal engineering and its applications.
6. Describe the working of different mechanical power transmission systems and power plants; learn basics of robotics.

PART A: BASIC CIVIL ENGINEERING

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering - Scope of each discipline - Building Construction and Planning- Construction Materials- Cement – Aggregate Bricks - Cement concrete- Steel- Tests on these materials.

Factors to be considered in Building Planning- Nature of Buildings- Typical Layouts of a Residential Building- Industrial Building- Commercial Building like a Supermarket / Hotel / Theatre.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Vertical Measurements- Angular Measurements- Levelling instruments used for levelling- Introduction to Bearings- Simple problems on levelling and bearings- Contour mapping.

UNIT III

Transportation Engineering, Water Resources and Environmental Engineering: Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences - Basic geometric design elements of a highway- Camber- Stopping Sight Distance- Super elevation- Introduction.

Water Resources and Environmental Engineering: Sources of water- Quality of water- Specifications and Tests- Introduction to Hydrology- Hydrograph – Rain water Harvesting- Rain water runoff- Water Storage Structures (Simple introduction to Dams and Reservoirs).

Textbooks:

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata Mcgraw Hill publications (India) Pvt. Ltd.
2. Basic Civil Engineering, S.S. Bhavikatti, New Age International Publishers.
3. Engineering Materials, Dr. S.C. Rangwala, Charotar Publishing House.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications.
5. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi.
6. Building Construction, Dr. B. C. Punmia, Lakshmi Publications, Delhi.

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi.

PART B: BASIC MECHANICAL ENGINEERING**UNIT I**

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants. **Mechanical Power Transmission** - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, cengagelearning India pvt. Ltd.

Reference Books:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak MPandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt.Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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23ACS03: DATA STRUCTURES

Course Objectives:

1. Understand the significance of linear data structures in problem-solving and basic time/space complexity analysis.
2. Create and manage linked lists to efficiently organize and manipulate data, emphasizing memory efficiency.
3. Implement and apply stacks to manage program flow and solve problems involving expression evaluation and backtracking.
4. Utilize queues to model real-world scenarios, such as process scheduling and breadth-first search algorithms and understand the versatility of deques and prioritize data management using priority queues.
5. Explore basic concepts of hashing and apply it to solve problems requiring fast data retrieval and management.

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

1. Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
2. Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
3. Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4. Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.
5. Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

UNIT I

Introduction to Data Structures:

Linear Data Structures- Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. **Non- Linear Data Structures-** Definition and importance of nonlinear data structures, Types and properties of nonlinear data structures

UNIT II

Linked Lists: Singly linked lists: representation and operations, Doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

Searching Techniques: Linear & Binary Search, **Sorting Techniques:** Bubble sort, Selection sort, Insertion Sort

UNIT III

Stacks: Introduction to stacks: properties and operations, Implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal, AVL Trees.

UNIT IV

Queues: Introduction to queues: properties and operations, Implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

Deque: Introduction to deque (double-ended queues), Operations on deque and their applications.

UNIT V

Graph Theory: Data Structures for Graphs- Adjacency Matrix Structure, Graph Traversals, Shortest Paths, Minimum Spanning Trees- Prim's Algorithm, Kruskal's Algorithm.

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Text Books:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta.
3. Classic Data Structures, Debasis Samanta, Second Edition, 2009, PHI

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick.
6. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002, Pearson.

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| 23AME02 | ENGINEERING WORKSHOP | L | T | P | C |
| | (Common to All branches of Engineering) | 0 | 0 | 3 | 1.5 |

Course Outcomes:

After completion of this course, the student will be able to.

CO1: Identify workshop tools and their operational capabilities.

CO2: Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.

CO3: Apply fitting operations in various applications.

CO4: Apply basic electrical engineering knowledge for House Wiring Practice.

SYLLABUS

1. **Demonstration:** Safety practices and precautions to be observed in workshop.

2. **Wood Working:** Familiarity with different types of woods and tools used in wood working and make following joints.

- a) Half– Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint.

3. **Sheet Metal Working:** Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.

- a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing

4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.

- a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-wheeler tyre

5. **Electrical Wiring:** Familiarity with different types of basic electrical circuits and make the following connections.

- a) Parallel and series b) Two-way switch c) Go down lighting d) Tube light
e) Three phase motor f) Soldering of wires

6. **Foundry Trade:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.

7. **Welding Shop:** Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.

8. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published, 2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuvanshi, Dhanpath Rai & Co.,2015&2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007,14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P. A.; Atul Prakashan,2021-22.



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20AHS06 - COMMUNICATIVE ENGLISH LAB

I B.Tech I Semester (Common to CSE, CSD, CSM, CE & ME)

I B.Tech II Semester (Common to ECE, EEE, CSC, IT, CAI, CSO, CSBS & EBM)

Course Objectives:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO2: Apply communication skills through various language learning activities.

CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.

CO4: Evaluate and exhibit professionalism in participating in debates and group discussions. CO5: Create effective Course Objectives:

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Young India Films
- Walden Infotech

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press. 2018.
2. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
4. J. Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2nd Ed), Kindle, 2013

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. <https://www.britishcouncil.in/english/online>
5. <http://www.letstalkpodcast.com/>
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. <https://www.youtube.com/c/ArnelsEverydayEnglish/featured>
8. <https://www.youtube.com/c/engvidAdam/featured>
9. <https://www.youtube.com/c/EnglishClass101/featured>
10. <https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists>
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. <https://www.youtube.com/user/letstalkaccent/videos>
2. <https://www.youtube.com/c/EngLanguageClub/featured>
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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**I B.Tech I SEM (Common to CSE, CSD, CSM)
II SEM (Common to EEE, ECE, EBM, CAI, CSO, CSC, IT)**

23AHS07

CHEMISTRY LAB

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Course Objectives: Verify the fundamental concepts with experiments.

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

CO1: Determine the cell constant and conductance of solutions.

CO2: Prepare advanced polymer Bakelite materials.

CO3: Measure the strength of an acid present.

CO4: Analyse the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb-Acid battery.

List of Experiments: (Any 10 experiments)

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry
13. pH metric Titration of strong acid vs. strong base
14. Determination of Viscosity of a polymer solution using Ostwald Viscometer

Reference: "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar

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23ACS04: DATA STRUCTURES LAB

Course Objectives:

1. Understand the significance of linear data structures in problem-solving and basic time/space complexity analysis.
2. Create and manage linked lists to efficiently organize and manipulate data, emphasizing memory efficiency.
3. Implement and apply stacks to manage program flow and solve problems involving expression evaluation and backtracking.
4. Utilize queues to model real-world scenarios, such as process scheduling and breadth-first search algorithms and understand the versatility of deques and prioritize data management using priority queues.
5. Explore basic concepts of hashing and apply it to solve problems requiring fast data retrieval and management.

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

1. Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
2. Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
3. Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
4. Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.
5. Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

List of Experiments:

1: Array Manipulation

- i) Implement basic operations on arrays: insertion, deletion, searching.
- ii) Create a program to find the maximum and minimum elements in an array.
- iii) Write a program to reverse an array.

2: Linked List Implementation

- i) Implement a singly linked list and perform insertion and deletion operations.
- ii) Develop a program to reverse a linked list iteratively and recursively.
- iii) Solve problems involving linked list traversal and manipulation.

3: Linked List Applications

- i) Create a program to detect and remove duplicates from a linked list.
- ii) Implement a linked list to represent polynomials and perform addition.
- iii) Implement a double-ended queue (deque) with essential operations.

4: Doubly Linked List Implementation

- i) Implement a doubly linked list and perform various operations to understand its properties and applications.

- ii) Implement a circular linked list and perform insertion, deletion, and traversal.

5: Stack Operations

- i) Implement a stack using arrays and linked lists.
- ii) Write a program to evaluate a postfix expression using a stack.
- iii) Implement a program to check for balanced parentheses using a stack.

6: Queue Operations

- i) Implement a queue using arrays and linked lists.
- ii) Develop a program to simulate a simple printer queue system.
- iii) Solve problems involving circular queues.

7: Stack and Queue Applications

- i) Use a stack to evaluate an infix expression and convert it to postfix.
- ii) Create a program to determine whether a given string is a palindrome or not.
- iii) Implement a stack or queue to perform comparison and check for symmetry.

8: Hashing

- i) Implement a hash table with collision resolution techniques.
- ii) Write a program to implement a simple cache using hashing.

Text Books:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Dinesh Mehta.

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms by Robert Sedgewick.