# COURSE STRUCTURE
# AND
# DETAILED SYLLABUS

## B.Tech

## in

## COMPUTER SCIENCE AND ENGINEERING
## (Cyber Security)

# Academic Regulation – R25

**Applicable for the batches admitted from 2025-2026**


**AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY**
**(Autonomous)**
(Approved by A.I.C.T.E., New Delhi & Affiliated to J.N.T.U.H, Hyderabad)
NAAC "A" Accredited Institute
Gunthapally (V), Abdullapurmet (M), R.R (Dist), Near Ramoji film City, Hyderabad, Pin - 501512.
www.aietg.ac.in, principalavih@avanthi.edu.in

# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Cyber Security)

# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

## Vision and Mission of the Institute

### VISION

To develop highly skilled professionals with ethics & human values.

### MISSION

1. To provide high-quality education along with professional training and exposure to the workplace.
2. To encourage a professional mindset that goes beyond academic achievement.
3. To promote holistic education among Department students by means of integrated pedagogy and scholarly mentoring for excellence in both personal and professional domains.
4. To consistently enhance the teaching and learning procedures in order to prepare students for successful careers in business or overseas or in further education.
5. To carefully prepare students to be globally employable professionals who will meet societal demands and contribute to the nation's technological advancement through their research and innovative talents.

### QUALITY POLICY

AIET focuses a strong emphasis on the moral principles of delivering cutting edge skilling by establishing the best infrastructure through interactive & activity-based learning. It also strives for an ambitious & effective governance that is responsive in every aspect, and makes use of the latest developments in knowledge and communication technology to encourage students to adopt a global perspective

# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Cyber Security)

## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

## Regulation: R25

## Vision and Mission of the Department

### DEPARTMENT VISION

To become a center of excellence the computer science and information technology discipline with a strong research and teaching environment.

### DEPARTMENT MISSION

1. To provide qualitative education and generate new knowledge by engaging in cutting edge research and by offering state of the art undergraduate, post graduate, leading careers as computer professional in the widely diversified of industry, government and academia.

2. To promote a teaching and learning process that yields advancements instate of art in computer science and engineering in integration of research result and innovative into other scientific discipline leading to new products.

3. To harness human capital for sustainable competitive edge and social relevance by including the philosophy of continuous learning and innovation in computer science and engineering.

4. To provide inculcate team work, imbibe leadership qualities, professional ethics and social responsibilities.

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# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
## (Cyber Security)
## Proposed Course Structure
### Programme: B.Tech- Computer Science and Engineering (Cyber Security)
### Regulation-R25
(Applicable from the academic year 2025-2026 to 2027-2028)

## Induction Programme

| S. No | Course Title | Category | L-T-P-C |
|---|---|---|---|
| 1 | Physical Activities--Sports, Yoga and Meditation, Plantation | MC | 0-0-6-0 |
| 2 | Career Counseling | 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 |

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# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**Course Structure**
**Program– B. Tech CSE (Cyber Security)**
**Regulation-R25**

(Applicable from the academic year 2025-2026 to 2028-2029)

Program: **B. Tech CSE (Cyber Security)** **Regulation: R25**

**I Year I Semester-Course Structure**

| S.No | Category | Course Code | Course Title | Hours per Week | | | |
|---|---|---|---|---|---|---|---|
| | | | | Lecture | Tutorial | Practical | Credits |
| 1 | BS | R25BS01 | Matrices and Calculus | 3 | 1 | 0 | 4 |
| 2 | BS | R25BS02 | Engineering Physics | 3 | 0 | 0 | 3 |
| 3 | ES | R25ES01 | Problem solving and programming with C | 3 | 0 | 0 | 3 |
| 4 | HS | R25HS01 | English for Skill Enhancement | 2 | 0 | 0 | 2 |
| 5 | ES | R25ES06 | Electronic Devices and Circuits | 3 | 0 | 0 | 3 |
| 6 | ES | R25ES09 | Python Programming | 2 | 0 | 0 | 2 |
| 7 | BS | R25BS03 | Engineering Physics Lab | 0 | 0 | 2 | 1 |
| 8 | ES | R25ES03 | Problem solving and programming with C Lab | 0 | 0 | 2 | 1 |
| 9 | HS | R25HS02 | English Language and Communication Skills Lab | 0 | 0 | 2 | 1 |
| 10 | ES | R25ES19 | Python Programming Lab | 0 | 0 | 2 | 1 |
| | | | **Total** | **16** | **1** | **8** | **21** |

| Category | Courses | Credits |
|---|---|---|
| BS-Basic Science courses | 3 | 8 |
| ES-Engineering Science courses | 5 | 10 |
| HM-Humanities Science and Management courses | 2 | 3 |
| MC-Mandatory courses | - | - |
| **Total** | **10** | **21** |

# DEPARTMENT OF CSE (CYBER SECURITY)

**Program: B. Tech CSE (Cyber Security)** **Regulation: R25**

**I Year II Semester- Course Structure**

| S.No | Category | Course Code | Course Title | Hours per Week | | | |
|---|---|---|---|---|---|---|---|
| | | | | Lecture | Tutorial | Practical | Credits |
| 1 | BS | R25BS04 | Differential Equations and Vector Calculus | 3 | 1 | 0 | 4 |
| 2 | BS | R25BS05 | Engineering Chemistry | 3 | 0 | 0 | 3 |
| 3 | ES | R25ES05 | Data Structures | 3 | 0 | 0 | 3 |
| 4 | ES | R25ES02 | Basic Electrical Engineering | 3 | 0 | 0 | 3 |
| 5 | ES | R25ES07 | Computer Aided Engineering Drawing | 2 | 0 | 2 | 3 |
| 6 | BS | R25BS06 | Engineering Chemistry Lab | 0 | 0 | 2 | 1 |
| 7 | ES | R25ES08 | Data Structures Lab | 0 | 0 | 2 | 1 |
| 8 | ES | R25ES04 | Basic Electrical Engineering Lab | 0 | 0 | 2 | 1 |
| 9 | ES | R25ES10 | Engineering Workshop & IT Skills Lab | 0 | 0 | 2 | 1 |
| 10 | MC | R25MC01 | Employability Skills | 0 | 0 | 2 | 0 |
| | | | **Total** | **14** | **1** | **12** | **20** |

| Category | Courses | Credits |
|---|---|---|
| BS-Basic Science courses | 3 | 08 |
| ES-Engineering Science courses | 6 | 12 |
| HS-Humanities Science and Management courses | - | - |
| MC-Mandatory courses | 1 | - |
| Total | 10 | 20 |

**Chairperson**
**Board of Studies (CSE)**

**R25BS01** **MATRICES AND CALCULUS** **3 1 0 4**

**(**Common to CSE, CSE(AI&ML), CSE(DS), CSE(CS), ECE, EEE, MECH).

**Course Objectives:**

1. 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.
2. Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form. And Orthogonal Transformation.
3. Geometrical approach to the mean value theorems and their application to the mathematical problems, Evaluation of surface areas and volumes of revolutions of curves. & Evaluation of improper integrals using Beta and Gamma functions.
4. Partial differentiation, concept of total derivative and Finding maxima and minima of function of two and three variables.
5. Evaluation of multiple integrals and their applications. And change of order of integration.

**Course Outcomes:**

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

| Course Code | Course Outcomes | Mapping with POs | | | DoK |
|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | |
| CO1 | Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations. | 3 | 3 | 3 | L1,L2,L3 |
| CO2 | Find the Eigen values and Eigenvectors. And Reduce the quadratic form to canonical form using orthogonal transformations. | 3 | 2 | 2 | L1,,L3 |
| CO3 | Solve the applications on the mean value theorems. Tracing of the curve | 3 | 3 | 2 | L1,L2,L3 |
| CO4 | Find thee extreme values of functions of two variables with/without constraints. | 3 | 3 | 2 | L3,L4 |
| CO5 | Evaluate the multiple integrals and apply the concept to find areas, volumes. | 3 | 2 | 3 | L4,L5 |

## SYLLABUS

**UNIT-I: Matrices** **12 HOURS**

Rank of a matrix by Echelon form and Normal form, Inverse of Non singular matrices by Gauss Jordanmethod, System of Linear equations: Solving system of Homogeneous and Non

Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method, LU decomposition method **COs: CO1**

**Self-learning Topics:** Evaluation of Rank of the Matrics

**UNIT-II: Eigen values and Eigen vectors 13 HOURS**

Linear Transformation and Orthogonal Transformation: Eigen values, Eigen vectors 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. **COs: CO2**

**Self-learning Topics:** Finding the Inverse of the Matrics by Using Different Methods

**UNIT-III: Single Variable Calculus 14 HOURS**

Limit and Continuous of functions and its properties. Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series theorems (without proof).

**Curve Tracing:** Curve Tracing in Cartesian Coordinates **COs: CO3**

**Self-learning Topics:** Tracing of the Curve and Evaluation of Limit point and continous point

**UNIT-IV: Multivariable Calculus (Partial Differentiation and applications) 10 HOURS**

Definitions of Limit and continuity. Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

**COs: CO4**

**Self-learning Topics:** Evaluation of maxima and minima by two variables

**UNIT-V: Multivariable Calculus (Integration) 12 HOURS**

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas(by double integrals) and volumes(by double integrals and triple integrals).

**COs: CO5**

**Self-learning Topics:** Finding the area by using double and triple integration

**Textbooks:**

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers,36th Edition,2010.
2. R.K. Jainand S. R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5thEditon,2016.

**Reference Books:**

1. Erwin kreyszig, Advanced Engineering Mathematics,9th Edition, John Wiley& Sons,2006.

2. G.B.ThomasandR. L.Finney, Calculus and Analyticgeometry,9th Edition,Pearson,Reprint, 2002.

**Web References / eBook Links**

1. MIT Open Course Ware – Linear Algebra
2. https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/
   a. Free lecture notes, assignments, and video lectures by Prof. Gilbert Strang.
3. Paul's Online Math Notes – Lamar University https://tutorial.math.lamar.edu/
   a. Covers Calculus I, II, III, Linear Algebra with step-by-step notes and examples.
4. NPTEL Courses (IITs – Video Lectures) https://nptel.ac.in/courses/111/106/111106100/
   a. Engineering Mathematics I: Video lectures on Matrices, Calculus, Multivariable Calculus.
5. K.A.Stroud–Engineering Mathematics (eBook) https://archive.org/details/EngineeringMathematicsKA.Stroud
   a. A widely used textbook covering matrix algebra, calculus, and more (free on Internet Archive).
6. GeeksforGeeks – Engineering Mathematics Tutorials https://www.geeksforgeeks.org/engineering-mathematics/
   a. Concept-wise explanations, coding implementations, and solved problems.

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 30% | 10% |
| L2 | 30% | 20% |
| L3 | 30% | 30% |
| L4 | 10% | 20% |
| L5 | -- | 20% |
| **Total (%)** | **100%** | **100%** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

**L1: Remembering**

1. Define rank of a matrix. *(Short)*
2. State Role's theorem. *(Short)*
3. Write the formula for Euler's theorem on homogeneous functions. *(Short)*
4. What is a Jacobians? *(Short)*

5. What is the procedure to Trace the Curve *(Short)*

**L2: Understanding**

1. Explain Gauss elimination method with an example. *(Long)* □
2. Describe the geometrical interpretation of Lagrange's Mean Value Theorem. *(Short)*
3. Explain diagonalization of a matrix using eigenvalues and eigenvectors. *(Long)*
4. Describe the reduction of a quadratic form to canonical form. *(Short)*
5. Explain the method of Lagrange multipliers for finding maxima and minima. *(Long)*

**L3: Applying**

1. Solve the system of equations using Gauss-Seidel iteration method. *(Long)*
2. Find the eigenvalues and eigenvectors of a 3x3 symmetric matrix. *(Long)*
3. Apply Taylor's series to approximate f(x)=1+xf(x) = \sqrt{1+x}f(x)=1+x near x = 0. *(Short)*

**L4: Analyzing**

1. Compare LU decomposition with Gauss elimination in solving linear equations. *(Short)*
2. Analyze the nature of a quadratic form and classify it using eigenvalues. *(Long)*
3. Given a function f(x,y)f(x, y)f(x,y), determine whether it has maximum or minimum using second-order partial derivatives. *(Short)*
4. Analyze the effect of changing the order of integration in a given double integral. *(Long)*
5. Discuss the implications of continuity and differentiability in multivariable functions. *(Short)*

**L5: Evaluating**

1. Justify why diagonalization is essential in solving systems of differential equations. *(Short)*
2. Critically evaluate the limitations of mean value theorems in non-differentiable functions. *(Long)*
3. Assess the accuracy of approximating functions using Taylor series versus actual function values. *(Long)*
4. Examine the usefulness of Jacobians in transformation of coordinates. *(Short)*
5. Evaluate the efficiency of using spherical coordinates in evaluating triple integrals over a sphere. *(Long)*

**Chairperson**
**Board of Studies (Mathematics)**

**R25BS02** **Engineering Physics** **3 0 0 3**
**(Common to all Branches)**

## Course Objectives:

1. Drawing indispensable connection between arrangement of atoms and molecules in crystal formation.
2. Understanding the basic principles in quantum mechanics and wave motion.
3. Appreciating the diverse mechanism, Qubit system and algorithms in quantum computing.
4. Understanding the fundamental concepts and applications of Magnetic and Dielectric materials in Engineering Physics.
5. Analyzing the characteristics, properties and applications of different types of LASERS & Optical Fibers.

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

| Course Code | Course Outcomes | Mapping with Pos | | | Dok |
|---|---|---|---|---|---|
| | | PO1 | PO2 | PO12 | |
| CO1 | Analyze crystal structures, identify defects, and apply XRD techniques for material characterization. | 3 | 2 | 1 | L1 ,L2 |
| CO2 | Apply quantum mechanical principles to explain particle behaviour and energy band formation in solids. | 3 | 2 | 3 | L2, L3 |
| CO3 | Understand quantum computing concepts, use quantum gates, and explain basic quantum algorithms. | 3 | 2 | 2 | L2, L3 |
| CO4 | Classify magnetic and dielectric materials and explain their properties, synthesis, and applications. | 3 | 2 | 2 | L1, L4 |
| CO5 | Explain the principles of lasers and fiber optics and their applications in communication and sensing. | 3 | 2 | 1 | L2, L5 |

## SYLLABUS

### UNIT – I: Crystallography & Material Characterization (11 Hours)

Introduction, Basic terms of crystallography, Crystal lattice, Lattice parameters, Bravais lattices, Crystal structures, Miller Indices, Inter-planar distances, APF (atomic packing factor- SC, BCC & FCC), Crystal defects (point, line, surface and volume), concept of nano-materials, Synthesis of nano material by using ball milling, characterization techniques ( XRD), Bragg's Law. **CO's-CO1**

### Unit – II: Quantum Mechanics (12 Hours)

Introduction, Black body radiation, Photoelectric effect, Hypotheses and principle of de-Broglie and Heisenberg, Physical significance of wave function, Postulates of Quantum mechanics, operators in Quantum mechanics, Eigen value and Eigen functions, Expectation value, Derivation of Schrodinger's wave equation

(time independent), Particle in potential well (1D), Classification of solids based on energy gap, Quantum confinement of nanomaterials. **CO's-CO2**

**UNIT –III: Quantum Computing (14 Hours)**

Introduction, Linear Algebra for quantum computation, Direc Bra-Ket notation and properties, Hilbert space & Bloch sphere, Concept of Quantum Computers, Difference between Classical & Quantum Bits, multiple qubits, Quantum computing system for information processing, Evolution of Quantum systems. **CO's-CO3**

**UNIT- IV: Magnetic & Dielectric Materials (12 Hours)**

Introduction to magnetic materials, origin of magnetic moment, classification of magnetic materials, Hysteresis, soft and hard magnetic materials, Synthesis of ferrimagnetic material using sol-gel method, applications of magnetic hyperthermia in Medical and Industrial fields.

Introduction to dielectric materials, Types of polarization (electronic, ionic and orientation), Types of dielectric materials (Ferro, Piezo and Pyro), Applications of Dielectric materials in Electronics & Computer Sciences. V **CO's-CO4**

**UNIT – V: Laser & Fiber Optics (13 Hours)**

Introduction to LASER, Characteristics of LASER, Relationship between Einstein Coefficients, Meta-stable state, Population inversion, Pumping and Lasing action in LASER, Types of Lasers (Ruby, He-Ne), Medical and Industrial applications of LASERs.

Introduction to fiber optics, Construction and Working principle of Optical Fibers, Derivations (θA, NA) Types of Optical fibers, Losses in optical fibers, Applications of optical fibres in Communication systems & Health monitoring systems. **CO's-CO5**

Board of Studies : Department of Physics

Approved in BOS No: 01, 12th Sep, 2025.

Approved in ACM No: 01, 26th Sep, 2025.

## Textbooks:

1. Walter Borchardt-Ott, Crystallography: An Introduction, Springer.
2. Charles Kittel, Introduction to Solid State Physics, John Wiley & Sons, Inc.
3. Thomas G. Wong, Introduction to Classical and Quantum Computing, Rooted Grove
4. M. N. Avadhanulu, P. G. Kshirsagar & TVS Arun Murthy: A Text book of Engineering Physics, S. Chand Publications, 11th Edition, 2019
5. Engineering Physics by Shatendra Sharma & Jyotsna Sharma, Pearson Publications, 2019

## Reference Books:

1. Jozef Gruska, Quantum Computing, McGraw Hill
2. Michael A. Nielsen & Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press.

3. John M. Senior, Optical Fiber Communications Principles and Practice, Pearson Education Limited.

**Web References:**

1. 1. https://nptel.ac.in/courses/115/106/115106119/ – Solid State Physics
2. https://nptel.ac.in/courses/115/106/115106086/ – Quantum Mechanics
3. https://qiskit.org/textbook/ – Quantum Computing
4. https://www.fiberoptics4sale.com/blogs/archive-posts – Fibre Optics
5. https://www.rp-photonics.com/encyclopedia.html – Lasers and Photonics

**E-Books:**

1. Crystallography: An Introduction – Walter Borchardt-Ott
2. Introduction to Solid State Physics – Charles Kittel
3. Introduction to Classical and Quantum Computing – Thomas G. Wong
4. Quantum Computation and Quantum Information – Michael A. Nielsen & Isaac L. Chuang
5. Optical Fiber Communications: Principles and Practice – John M. Senior

## Internal Assessment Pattern

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 40 | 20 |
| L2 | 30 | 30 |
| L3 | 30 | -- |
| L4 | -- | 30 |
| L5 | -- | 20 |
| **Total (%)** | **100** | **100** |

## Sample Short and Long Answers questions of Various Cognitive Levels

**Remember**

1. Define Miller indices.
2. State Bragg's law.
3. Write Schrödinger's time-independent wave equation.
4. List types of magnetic materials.
5. Define population inversion.

**L2 – Understand**

1. Explain the significance of the de-Broglie wavelength.
2. Describe the concept of quantum confinement.
3. Explain the construction and working principle of a Ruby laser.
4. Differentiate between ferroelectric and piezoelectric materials.
5. Explain the concept of numerical aperture in optical fibers.

**L3 – Apply**

1. Calculate the inter-planar distance for given Miller indices and lattice constants.

2. Determine energy levels for a particle in a 1D box of given length.
3. Calculate the d spacing for the given values of n, $\lambda$ and $\theta$ using Bragg's law.
4. Compute the acceptance angle for an optical fiber for the given refractive indices.
5. Solve a problem involving magnetization using Weiss theory.

**L4 – Analyze**

1. Compare the applications of SEM and XRD in material characterization.
2. Analyze differences between classical and quantum computing in terms of speed and complexity.
3. Evaluate the performance of different magnetic materials for electric vehicle motors.
4. Analyze loss mechanisms in optical fibers.
5. Compare various laser types for industrial cutting applications.

**L5 – Evaluate/Create**

1. Design a basic quantum circuit for a 2-qubit entanglement experiment.
2. Propose a novel application of piezoelectric materials in IoT devices.
3. Develop a new method for reducing fiber optic losses in long-distance communication.
4. Formulate a magnetic material synthesis method for a specific biomedical application.
5. Create a computational model to simulate the effect of lattice defects on XRD patterns.

**Chairperson**
**Board of studies (Engineering Physics)**

**R25ES01 PROBLEM SOLVING AND PROGRAMMING WITH C 3 0 0 3**

**(Common to all Branches)**

**Course Objectives:**

1. To impart adequate knowledge on the need of programming languages and problem-solving techniques and develop programming skills.
2. To express algorithms and draw flowcharts in a language independent manner.
3. To enable effective usage of Operators & Control Structures.
4. To learn about the design concept of Arrays, Strings and Functions.
5. To understand Structures and Unions and their usage.
6. To assimilate about Pointers, Dynamic Memory Allocation and know the significance of Pre-processors, perform operations on files.

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | | | Dok |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PS01 | PS02 | |
| CO1 | Illustrate the fundamental concepts of computers and basic computer programming and problem-solving approach. | 3 | 3 | 2 | 3 | 2 | L1, L2 |
| CO2 | Understand the Control structures, Branching and Looping. | 3 | 3 | 3 | 3 | 2 | L1, L2 L3 |
| CO3 | Make use of Arrays and Develop Programs on modular programming using functions and strings. | 3 | 3 | 3 | 2 | 3 | L1, L2, L3 |
| CO4 | Demonstrate the ability to write programs using Structures and Unions. | 3 | 3 | 3 | 3 | 2 | L4 |
| CO5 | Apply File handling operations. | 3 | 3 | 3 | 3 | 3 | L4, L5 |

**SYLLABUS**

**UNIT-I:**

**Introduction to Computers** – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms( Ex: Biggest of three numbers, Quadratic root Equations) flowcharts and Pseudo code.

**Introduction to C Language –** Structure of C Programs, Identifiers, Data Types, Tokens, Keywords, Variables, Scope, Life time variable, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements-Condition Statements (Decision Making) – if and switch statements, Control statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Command Line Arguments. **COs–CO1**

Self-Learning Topics: Compilation and Interpretation.

**UNIT- II:**

**Arrays**: Concepts, Declaration, Initialization of an array, Types of an array, Array applications (Linear Search, Binary search and Bubble sort).

**Functions:** Designing Structured Programs, Functions, user defined functions, types of functions, inter function communication, Parameter Passing Technics, passing an array to a function, type qualifiers, recursive functions, Limitations of recursion, Storage classes-auto, register, static, extern, scope rules. **COs-CO2**

Self-Learning Topics: Function Passing Technics

**UNIT – III:** **15 Hours**

**Pointers** – Introduction (Basic Concepts), Pointers, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, dynamic memory allocation functions (malloc(), calloc(), realloc(), and free()) , array of pointers, poniter applications, pointers to void, pointers to functions.

**Strings** – Concepts, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion.

**COs–CO3**

Self-Learning Topics: String Pattern Matching

**UNIT- IV:** **10 Hours**

**Structures:** Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, passing structures through pointers, self-referential structures.

**Unions:** Declaration, initialization, accessing union. **COs–CO4**

Self-Learning Topics: How do you pass a structure to a function?

**UNIT-V:** **10 Hours**

**File I/O:** Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file modes, file input / output functions (standard library input / output functions for files), Positioning functions (fseek ,rewind and ftell), Enumerated data type, Type def and bit fields, Preprocessor commands.

**COs-CO5**

Self-Learning Topics: Binary Files and operations on Binary files

Board of Studies: Computer Science and Engineering.

Approved in BOS No: 01, 12-09-2025

Approved in ACM No: 01, 26-09-2025

**TEXT BOOKS:**

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.
3. Kanetkar Y, “Let us C”, BPB Publications, 2007.
4. 4. Hanly J R & Koffman E.B, “Problem Solving and Program design in C”, Pearson Education, 2009.

**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) Pvt Ltd.
3. E. Balaguruswamy, “Programming with ANSI-C”, Fourth Edition, 2008, Tata McGraw Hill.
4. Let us „C‟ ,By Yashavanth Kantkar, bpb Publication.
5. Venugopal K. R and Prasad S. R, “Mastering „C‟”, Third Edition, 2008, Tata McGraw Hill.

**Web References:**

1. http://www.c4learn.com/
2. http://www.geeksforgeeks.org/c/
3. http://nptel.ac.in/courses/122104019/
4. http://www.learn-c.org/
5. https://www.tutorialspoint.com/c programming/

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 35 | -- |
| L2 | 40 | -- |
| L3 | 25 | 40 |
| L4 | -- | 35 |
| L5 | -- | 25 |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of various Cognitive Levels**

**L1: Remember**

1. What are the five key features of the C programming language?
2. What are the top 5 applications of C programming language?
3. What do you mean by reserved words in C programming language?
4. What do you mean by library functions?
5. List the name of the tokens.
6. What is static() function in C programming?
7. What is the difference between operators = and ==?
8. What are 3 main drawbacks of C language?
9. What is the difference between R-value and L-value?
10. How does const char*p differ from the char const* p

**L2: Understand**

1. What is the importance of function?
2. Explain the function prototype with an example.
3. What do you mean by error? Discuss types of errors() in C language.

4. What do you mean by function pointer?
5. What is a header file in the C programming language?
6. How can you implement decision-making processes in C language?
7. What are the 4 primary sections to define a function in C language?
8. What are modifiers? List the C programming modifiers?
9. What is an array, and why does it play a major role in C programming?
10. Is size of( ) a function or operator?

**L3: Apply**

1. Program to find Factorial of number?
2. Fibonacci Series Program?
3. Palindrome Program?
4. Program to reverse a String?
5. Find a given number is Armstrong Number?
6. Print first n Prime Numbers?
7. Find Largest among n Numbers?
8. LCM of Two Numbers?
9. GCD of Two Numbers?
10. Reverse a String?

**L4: Analysing**

1. Swapping Two Numbers using Bitwise operators?
2. Copy File to another File?
3. C program to get and set system current system date and time?
4. C program to run DOS command?

**L5: Evaluating**

1. C program to find two smallest elements in a one-dimensional array?
2. C program to find odd or even numbers using Bit masking?
3. Swapping two bits of byte using C program?

**Chairperson**
**Board of Studies (CSE)**

**R25HS01** **ENGLISH FOR SKILL ENHANCEMENT** **2 0 0 2**

**(Common to all Branches CSE (AI&ML), CSE(DS), CSE(CS),ECE & MECH)**

**Learning Objectives**

This course will enable students to:

1. Improve vocabulary and use it effectively in oral and written communication.
2. Apply correct grammar and sentence structures in various communication contexts.
3. Develop reading comprehension skills through known and unknown passages.
4. Write coherent and structured paragraphs, essays, précis, and formal letters.
5. Acquire skills for writing abstracts, technical reports, and professional documents.

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

| CO Code | Course Outcomes | Mapping with POs | | | Pos |
|---|---|---|---|---|---|
| | | PO9 | PO10 | PO11 | |
| CO1 | Use an enhanced vocabulary with accuracy in spoken and written English. | 1 | 3 | 2 | L1,L2 |
| CO2 | Apply rules of functional grammar and sentence structures to avoid common errors. | 2 | 3 | 1 | L2,L3 |
| CO3 | Demonstrate effective reading strategies for comprehension and critical understanding. | 2 | 3 | 1 | L2,L3 |
| CO4 | Write structured paragraphs, essays, précis, and formal letters in appropriate formats. | 2 | 3 | 1 | L2,L3,L4 |
| CO5 | Prepare professional abstracts and reports following formal writing conventions. | 1 | 2 | 3 | L2,L3,L4 |

**Board of Studies: Department of English**
**Approved in BOS No:01**
**Approved in ACM No:01**

## SYLLABUS

**UNIT –I : Theme-Perspectives** **12hours**

**Lesson: 'The Generation Gap' by Benjamin M. Spock**

**Vocabulary**: The Concept of Word Formation -The Use of Prefixes and Suffixes - Words Often Misspelt - Synonyms and Antonyms

**Grammar:** Identifying Common Errors in Writing with Reference to Parts of Speech particularly Articles and Prepositions – Degrees of Comparison

**Reading:** Reading and Its Importance- Sub Skills of Reading – Skimming and Scanning.

**Writing:** Sentence Structures and Types -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing Precisely – Nature and Style of Formal Writing. **Co's-CO1**

**UNIT-II Theme-Digital Transformation** **10hours**

**Lesson: '*Emerging Technologies*'**

**Vocabulary:** Homophones, Homonyms and Homographs

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

**Reading:** Reading Strategies-Guessing Meaning from Context – Identifying Main Ideas – Exercises for Practice

**Writing:** Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence – Linkers and Connectives - Organizing Principles in a Paragraph – Defining- Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence - Essay Writing - Writing Introduction and Conclusion. **Co's-CO2**

**UNIT-III** **Theme-Attitude and Gratitude** **12hours**

**Poem:** **Leisure' by William Henry Davies and 'Be Thankful' *by* Unknown author**

**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 – Identifying Topic Sentence and Providing Supporting Ideas - Exercises for Practice.

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

**Co's-CO3**

**UNIT-IV** **Theme-Entrepreneurship** **10hours**

**Lesson:** **Why a Start-Up Needs to Find its Customers First by Pranav Jain**

**Vocabulary**: Standard Abbreviations in English – Inferring Meanings of Words through Context – Phrasal Verbs – Idioms.

**Grammar:** Redundancies and Clichés in Written Communication – Converting Passive to Active Voice and Vice-Versa.

**Reading**: Prompt Engineering Techniques– Comprehending and Generating Appropriate Prompts - Exercises for Practice

**Writing:** Writing Practices- Note Making-Précis Writing. **Co's-CO4**

**UNIT-V** **Theme-Integrity and Professionalism** **10hours**

**Lesson:** **Professional Ethics**

**Vocabulary**: Technical Vocabulary and their Usage– One Word Substitutes – Collocations.

**Grammar:** Direct and Indirect Speech - Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

**Reading:** Survey, Question, Read, Recite and Review (SQ3R Method) – Inferring the Meaning and Evaluating a Text- Exercises for Practice

**Writing:** Report Writing - Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Technical Report. **Co's-CO5**

**TEXT BOOK:**

1. Board of Editors. *2025*. English for the Young in the Digital World. Orient Black Swan Pvt. Ltd.

**REFERENCE BOOKS:**


1. Swan, Michael. (2016). Practical English Usage. Oxford University Press. New Edition.
2. Karal, Rajeevan. *2023*. English Grammar Just for You. Oxford University Press. New Delhi
3. 2024. Empowering with Language: Communicative English for Undergraduates. Cengage Learning India Pvt. Ltd. New Delhi
4. Sanjay Kumar & Pushp Lata. 2022. Communication Skills – *A Workbook.* Oxford University Press. New Delhi
5. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.
   Mc Graw-Hill Education India Pvt. Ltd


- **Web References:**
  1. https://www.grammarly.com/blog/ – Grammar tips.
  2. https://owl.purdue.edu/ – Academic writing resources.
  3. https://www.oxfordlearnersdictionaries.com/ – Vocabulary and pronunciation.
  4. https://www.britishcouncil.org/english – English learning resources.
  5. https://writingcenter.unc.edu/ – Writing and editing strategies.

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 40 | 20 |
| L2 | 30 | 30 |
| L3 | 30 | -- |
| L4 | -- | 30 |
| L5 | -- | 20 |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

**L1 – Recall (Short Answer Type)**

1. Define a Phrase and clause? **(SA)**
2. List the examples for Prefix and Suffix? **(SA)**
3. State the Kinds of Clauses ? **(SA)**
4. Name any two examples for Imperative Sentence? **(SA)**
5. Write the Antonym for Convict? **(SA)**

**L2 – Understand**

1. Explain the different processes of Word Formation ? **(LA)**
2. Describe the Reading Strategies and Its importance ? **(LA)**
3. Explain the Techniques for Writing Precisely ? **(LA)**
4. Discuss the Commonly misspelt words? **(SA)**
5. Explain Skimming and Scanning ? **(SA)**

**L3 – Apply**

1. Explain the Homonyms, Homographs and Homophones ? **(LA)**

2. Write a paragraph on the topic "Cloud Computing" ? **(LA)**
3. Determine a report on '*Meri Mati Mera Desh'* campaign announced by PM Narendra Modi? **(LA)**
4. Write your opinion on the accommodation of Indian words into the English? Do you think it is a welcome sign? Explain your answer? **(SA)**
5. 'Make hay while the sunshines.' Explain this proverb using a real-life example? **(LA)**

**L4 – Analyze**

1. Describe your College Day Celebrations inabout200 words? **(LA)**
2. Analyse the metaphor of "Toasting" and its implications for the language? **(LA)**
3. Compare the experience of your college with school in about 200 words **(LA)**
4. Analyze on the topic Artificial Intelligence. **(SA)**
5. Examine the role of Communication Skills in Corporate Company ? **(SA)**

**L5 – Create**

1. Design the main characteristics of good paragraph? Write a paragraph on your own incorporating these essential features of a paragraph? **(LA)**
2. Develop a technical report on the feasibility of an anti-ragging cell in your college.? **(LA)**
3. Propose the importance of creating Coherence when writing a paragraph? Explain your answer using an example paragraph of your own **(LA)**
4. Formulate the Steps to Write a Formal Letter ? **(LA)**
5. Design a Resume for Assistant Manager in a Well reputed Company with requisite qualifications and Experience ? **(LA)**

**Chairperson**
**Board of studies (English)**

**R25ES06** **ELECTRONIC DEVICES AND CIRCUITS** **3 0 0 3**

(Common to CSE, CSM, CSD, CSC, ECE &EEE)

**Course Objectives:**

1. To study the characteristics and applications of semiconductor diodes.
2. To understand the working principles and characteristics of Bipolar Junction Transistors (BJT).
3. To analyze biasing techniques and stability of BJT circuits.
4. To understand Field Effect Transistors (FETs), MOSFETs, and advanced devices like Fin FETs and CNTFETs.
5. To explore the operation and applications of special-purpose diodes.

| Course Code | Course Outcomes | Mapping with POs | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | P04 | P05 | P06 | P011 | Dok |
| C01 | Describe the working of diode, BJT and FET, their biasing methods, and deduce the expressions for device parameters/ current/ and current-voltage relationships. | 3 | 3 | - | 2 | 2 | - | - | L1,L2 |
| C02 | Analyze and design diode-based circuits such as rectifiers, clippers, and clampers. | 2 | 3 | 2 | 2 | 2 | - | - | L2,L3 |
| C03 | Design appropriate biasing circuits using BJT and analyze the low frequency transistor (BJT) amplifier circuits | 3 | 3 | 3 | 2 | 2 | - | - | L2,L3 |
| C04 | Analyze the low frequency FET amplifier circuits and understand the MOSFET operation. | 3 | 3 | 2 | 2 | 2 | - | 1 | L4,L5 |
| C05 | Acquire the knowledge about the role of special purpose electronic devices and their applications. | 2 | 2 | 2 | 2 | 2 | 1 | 2 | L4,L5 |

**Syllabus:**

**UNIT-I:** **12 Hours**

**Diode:** PN junction as a Diode, V-I characteristics, Diode resistance, Transition and Diffusion capacitance, Diode equivalent circuit, Specifications.

**Diode Applications:** Rectifiers - Half-wave, Full-wave (center-tap and bridge), Capacitor filter for rectifiers, Clippers and clampers **COs-CO1**

**UNIT-II:** **14 Hours**

**Bipolar Junction Transistor (BJT):** Working principle, Current components, Common Base (CB), Common Emitter (CE), Common Collector (CC) configurations, Input and output characteristics, Transistor as an Amplifier.

**BJT Biasing:** Load line and operating point, Biasing techniques: Fixed bias, Collector-to-base bias, Self bias, Bias Stability, Thermal runaway, Bias compensation using diodes. **COs-CO2**

**UNIT-III:** **12 Hours**

**BJT Amplifiers:** Transistor Hybrid parameter model, 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. **COs-CO3**

**UNIT-IV:** **11 Hours**

**Field Effect Transistors (FET):** Junction FET: Structure, operation, and characteristics, MOSFET: Enhancement and Depletion mode, Comparison of BJT and FET, FET Small Signal Model, Analysis of CS and CD JFET Amplifiers, Introduction to FinFET and CNTFET. **COs-CO4**

**UNIT-V:** **10 hours**

**Special Purpose Devices:** Breakdown mechanisms in Zener Diodes, Zener diode characteristics and application, Structure, operation and characteristics of SCR and UJT, Principle of operation and characteristics of Tunnel diode, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

**COs-CO5**

**Self-Learning Topics**: BJT and FET operations at high frequency

Board of Studies: Electronics and Communication Engineering

Approved in BOS No: 01,08$^{th}$Sep2025

Approved in ACM No: 01, 26$^{th}$Sep2025

**TEXTBOOKS:**

1. Jacob Millman, Christos C. Halkias, Satyabrata Jit - Electronic Devices and Circuits, McGraw-Hill Education, 4ed., 2016.
2. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory. Pearson, 11ed., 2015.

**REFERENCEBOOKS:**

1. Principles of Electronic Devices And Circuits, Dr S.Kishore Reddy, Dr.K. Sanjeevarao, Mr.Vasantha Naga Raju, Mrs.J.Merina.
2. David A. Bell, Electronic Devices and Circuits, Oxford University Press, 5ed., 2008.
3. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits, Oxford University Press, 7ed., 2014.
4. G.K. Mithal, Electronic Devices and Circuits, Khanna Publishers, 23ed., 2017.
5. S. Salivahanan and N. Suresh Kumar, Electronic Devices and Circuits, McGraw-Hill Education, 4ed., 2017.

**Web References:**

1. https://www.allaboutcircuits.com/
2. https://nptel.ac.in/courses/108/105/108105158/
3. https://electronics-tutorials.ws/
4. https://www.electronics-notes.com/
5. https://www.ti.com/

**E-Books:**

1. Electronic Devices and Circuit Theory – Boylestad & Nashelsky.
2. Microelectronic Circuits – Sedra & Smith.
3. Electronic Devices – Floyd.
4. Semiconductor Physics and Devices – Neamen.
5. Fundamentals of Electronics – Agarwal & Lang.

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 20% | 15% |
| L2 | 30% | 25% |
| L3 | 35% | 40% |
| L4 | 10% | 15% |
| L5 | 5% | 5% |
| **Total (%)** | **100** | **100** |

**Sample Questions by Cognitive Level**

**L1 – Remember**

1. Define static and dynamic resistance of a diode.
2. List the differences between CE, CB, and CC configurations.
3. State the applications of Zener diode.
4. Define pinch-off voltage.
5. Write the diode current equation.

**L2 – Understand**

1. Explain the working of a bridge rectifier with a neat diagram.
2. Describe the principle of operation of a BJT.
3. Explain the working of an SCR.
4. Discuss the clamping circuit theorem.
5. Describe the function of MOSFET as a voltage-controlled device.

**L3 – Apply**

1. Design a capacitor filter for a full-wave rectifier to meet given specifications.
2. Calculate the output voltage of a clipper circuit for given input conditions.
3. Determine the voltage gain of a CE amplifier with given parameters.
4. Apply the JFET characteristics to design a voltage variable resistor.
5. Calculate the efficiency of a half-wave rectifier.

**L4 – Analyzing**

1. Compare the performance of capacitive and inductive filters.
2. Analyze the effect of load resistance on rectifier output.
3. Compare BJT and MOSFET in amplifier applications.
4. Analyze the switching performance of a BJT in a given circuit.
5. Compare different types of special purpose diodes.

**L5 – Evaluating**

1. Propose a design for a regulated power supply using Zener diode.
2. Evaluate the suitability of FETs for low-noise amplifier applications.
3. Develop a circuit using LEDs for an optical communication link.
4. Create a design for a solar cell-based power system for a small load.
5. Design a UJT relaxation oscillator for a given frequency.

**Chairperson**
**Board of Studies (ECE)**

**R25ES09** **Python Programming** **2 0 0 2**

**(Common to all Branches)**

**Prerequisites**: Requires analytical skills and logical reasoning.

**Course Objectives:**

1. Learn Syntax and Semantics and create Functions in Python.
2. Handle Strings and Files in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Implement Object Oriented Programming concepts in Python.
5. Build Web Services and introduction to Network and Database Programming in Python.

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | | | Dok |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PS01 | PS02 | |
| CO1 | Examine Python syntax and semantics and be fluent in the use of Python flow control and functions | 3 | 3 | 3 | 3 | 3 | L1, L2 |
| CO2 | Demonstrate proficiency in handling Strings and File Systems. | 3 | 3 | 2 | 2 | 3 | L1, L2 L3 |
| CO3 | Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions | 3 | 3 | 3 | 2 | 3 | L1, L2, L3 |
| CO4 | Interpret the concepts of Object-Oriented Programming as used in Python. | 3 | 3 | 3 | 3 | 2 | L4 |
| CO5 | Implement exemplary applications related to Network Programming, Web Services and Databases in Python | 3 | 3 | 3 | 3 | 3 | L4, L5 |

## SYLLABUS

**UNIT-I:** **10 Hours**

**Introduction to python programming:** Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types

**Control Structures**: - Selection Statements: if statement, if-else statement, if-elif-else statement, nested-if statement.

**Iterative Statements:** while loop, for loop, break statement, continue statement, pass and else statements used with loops **COs–CO1**

Self-Learning Topics: Standard Types and

**UNIT- II:**

**Strings:** Creation, Indexing, Slicing, Methods, String Formatting, **Lists:** Creation, Indexing, Slicing, List Comprehension, Methods, **Tuples:** Properties, Indexing, Methods, **Sets:** Creation, Operations, Methods, **Dictionaries:** Creation, Access, Methods, Dictionary Comprehension, Iterating over data structures. **Cos-CO2**Self-

Learning Topics: Dictionaries methods

**UNIT- III:** **10 Hours**

**Functions**: Need for functions, Function definition, Function call, Variable scope and lifetime, Return statement, Positional arguments, Keyword arguments, Default arguments and variable length arguments, Recursive functions, Lambda functions, Generators

**File:**File Objects, File Built-in Function, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules. **COs–CO3**

Self-Learning Topics: Functions Arguments

**UNIT – IV:** **12 Hours**

**Exceptions in Python:** Errors in Python Program: Compile-Time Errors, Runtime Errors, Logical Errors, Exception Handling, Types of Exceptions, and Keywords in Exception handling.

**Regular Expressions:** Introduction, Special Symbols and Characters, Res and Python

**Multithreaded Programming:** Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules. **COs–CO4**

Self-Learning Topics: Multithreading

**UNIT- V:** **10 Hours**

**GUI Programming:** Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

**Web Programming:** Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application, Advanced CGI, Web (HTTP) Servers. **COs-CO5**

Self-Learning Topics: To learn the Tkinter and CGI

Board of Studies: Computer Science and Engineering.

Approved in BOS No: 01, 12-09-2025

Approved in ACM No: 01, 26-09-2025

**TEXT BOOK:**

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Python Programming: Using Problem Solving Approach by Reema Thareja, Oxford Higher Education

**REFERENCE BOOKS:**

1. Think Python, Allen Downey, Green Tea Press
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
5. Learning Python, Mark Lutz, O'Really

**Web References:**

1. https://onlinecourses.nptel.ac.in/noc19_cs41/preview
2. https://www.coursera.org/specializations/python
3. https://www.coursera.org/learn/python-for-applied-data-science-ai

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 40 | -- |
| L2 | 40 | -- |
| L3 | 20 | 25 |
| L4 | -- | 35 |
| L5 | -- | 40 |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of various Cognitive Levels**

**L1: Remember**

1. What is Python?
2. Mention any two unique features of Python.
3. Who developed Python and when was it released?
4. List two differences between Python 2 and Python 3.
5. What are keywords in Python? Give examples.
6. Define variables and literals in Python.
7. What are identifiers? State any two rules for naming them.
8. Write the syntax to take input from the user in Python.
9. What is the role of indentation in Python?
10. Explain the history and evolution of Python programming language.
11. Describe the major differences between Python 2 and Python 3.
12. Write a Python program to print "Hello, World!" and explain each line of code.
13. Explain Python tokens with examples.
14. What are fundamental data types in Python? Explain each with an example.
15. Discuss input and output handling in Python with suitable examples.
16. Describe the different types of number data types in Python.
17. Explain control flow statements in Python with examples (if, if-else, if-elif-else, nested if).
18. Explain for and while loops in Python. Write a program using each.
19. Differentiate between break, continue, and pass statements with examples.
20. What are identifiers? Explain the rules and conventions for naming them in Python.
21. Discuss the significance of indentation in Python. Why is it important?
22. Write a Python program to find the sum of all even numbers from 1 to 100 using a loop.

**L2: Understand**

1. Explain list operations: creation, insertion, updating, deletion, searching, and sorting with examples.
2. Write a Python program to demonstrate nested lists and access nested elements.
3. What is list comprehension? Write a program to filter even numbers from a list.
4. Compare lists and tuples in terms of mutability and performance.
5. Write a Python program to create and access elements in a nested tuple.
6. Write a program to sort elements in a tuple.
7. Explain string initialization, slicing, and concatenation with examples.
8. Describe various string handling methods (like upper(), lower(), replace(), split(), etc.)
9. Write a program to format a sentence using f-strings and .format() method.
10. Explain set creation and operations (union, intersection, difference, symmetric difference) with code.
11. Write a Python program to remove duplicates from a list using sets.
12. Describe CRUD operations on dictionaries with examples.
13. What are dictionary methods? Demonstrate get(), items(), update(), and pop() with code.
14. Write a program to sort a dictionary by its keys and values using lambda.
15. What are regular expressions? Explain sequence characters, quantifiers, and special characters with examples.

**L3: Apply**

1. Describe the concept of variable scope and lifetime in Python with suitable examples.
2. Define a function in Python.
3. What is the need for functions in programming?
4. Write a recursive function to compute the factorial of a number.
5. Discuss lambda functions and provide examples demonstrating their use.
6. Explain generators in Python and write a generator function using yield to produce even numbers up to a limit.
7. Write a function that takes a list and returns the sum of even numbers using filter() and lambda.
8. What does the return statement do in a function?
9. Describe the process of opening, reading, writing, and closing files in Python with code snippets
10. Write a program to read a text file and count the number of lines, words, and characters
11. Demonstrate how to write a list of strings to a file and then read and display the contents
12. Differentiate between text files and binary files in Python, with examples.
13. What are the different modes to open a file in Python?
14. Write the syntax to open and close a file.
15. How do read(), read line(), and read lines() differ?
16. What is the use of the with statement for file operations?
17. How do you write data to a file in Python

**L4: Analysing**

1. Explain the main concepts of OOP with examples: Class, Object, Inheritance, Polymorphism, Encapsulation, and Abstraction.
2. Compare and contrast structured programming and object-oriented programming.
3. Write a Python program to define a class with data members and methods, then create an object to access them.

4. Explain inheritance with an example program showing single and multiple inheritances.
5. How does polymorphism work in Python? Give a practical example.
6. Describe the different types of errors that can occur in a Python program.
7. Explain the syntax and flow of exception handling in Python with try, except, else, and finally blocks.
8. Write a program that handles multiple exceptions using Python's exception handling mechanism.
9. What is the role of the raise keyword? Write an example.
10. Write a Python program that demonstrates the use of custom exceptions.

**L5: Evaluating**

1. What is the difference between a process and a thread?
2. Explain the concept of the Global Interpreter Lock (GIL) in Python.
3. What are the `thread` and `threading` modules in Python?
4. How do threads improve program performance?
5. Name some related modules used in Python for threading.
6. Mention some other GUI frameworks available for Python besides Tk inter.
7. What are the basic steps to create a simple GUI window using Tk inter?
8. Name any two widgets commonly used in Tkinter.
9. What is the role of the event loop in GUI programming
10. Explain threads and processes with examples. How does multithreading differ from multiprocessing
11. What is the Global Interpreter Lock (GIL)? How does it affect multithreading in Python?
12. Write a Python program using the `threading` module to create and run multiple threads.
13. Discuss synchronization issues in multithreaded programs and how Python handles them.
14. Describe the Tkinter module and explain how to create a basic window application using it.
15. Write a Python program using Tkinter to create a GUI with a button that displays a message when clicked.
16. What are the roles of widgets and geometry managers in Tkinter? Explain with examples

**Chairperson**
**Board of Studies (CSE)**

**R25BS03** **ENGINEERING PHYSICS LAB** **0 0 2 1**

**(Common to all)**

**Course Objectives:**

1. To provide practical exposure to advanced concepts in solid-state, modern physics, and material science.
2. To synthesize nonmaterial's and study their physical, electrical, magnetic, and optical properties.
3. To perform semiconductor characterization using Hall Effect, band gap, and related techniques.
4. To explore and experimentally verify principles of lasers, optical fibers, and the photoelectric effect.
5. To develop skills in experimental data analysis, application of least squares method, and technical reporting.

**Course Outcomes**

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | DoK |
| CO1 | To Determine the value of Planck's constant, Energy gap, Hall co-efficient experimentally and to Synthesize magnetite using sol-gel method. | 3 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | 1 | | L1, L2 |
| CO2 | Practical Study of the B-H curve and P-E loop & determination of magnetic moment, dielectric constant. | 3 | 3 | 2 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | | L2, L3 |
| CO3 | To observe Curie temperature, calculate least squares of a torsional pendulum, study the wave length and V-I, L-I characteristics of a laser, bending losses, NA of an optical fiber practically. | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | | L3 |

Board of Studies: Department of Physics

Approved in BOS No: 01, -- August, 2025

Approved in ACM No: 01

1. Determination of work function and Planck's constant using photoelectric effect. CO's-CO1
2. Synthesis of magnetite ($Fe_3O_4$) powder using sol-gel method. CO's-CO1

3. Determination of energy gap of a semiconductor. CO's-CO1
4. Determination of Hall coefficient and carrier concentration of a given semiconductor. CO's-CO1
5. Determination of magnetic moment of a bar magnet and horizontal earth magnetic field. CO's-CO2
6. Study of B-H curve of a Ferro magnetic material. CO's-CO2
7. Study of P-E loop of a given ferroelectric crystal. CO's-CO2
8. Determination of dielectric constant of a given material. CO's-CO2
9. Determination of Curie's temperature of a given ferroelectric material. CO's-CO3
10. A) Determination of wavelength of a laser using diffraction grating. CO's-CO3
    B) Study of V-I & L-I characteristics of a given laser diode.
11. A) Determination of numerical aperture of a given optical fiber. CO's-CO3
    B) Determination of bending losses of a given optical fiber.
12. Understanding the method of least squares - torsional pendulum as an example. CO's-CO3

**Reference Books:**

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

**Online Learning Resources:**

1. Engineering Physics Practical by S.P. Singh & Manisha
2. Practical Physics by G.L. Squires
3. Engineering Physics by M.N. Avadhanulu & P.G. Kshirsagar
4. Applied Physics for Engineers by Neeraj Mehta
5. Optoelectronics and Photonics by S.O. Kasap

**Sample Questions (L1–L5)**

## L1 – Recall (SA)

1. Define Hall coefficient and verify experimentally.
2. Find the Curie's temperature of a given ferromagnetic material.
3. Write the Aim, apparatus, procedure to find the dielectric constant of a given material.
4. List the losses in an optical fiber and prove experimentally.
5. Find the numerical aperture of a given optical fiber and write the procedure and result**.**

## L2 – Understand (SA/LA)

1. Synthesize magnetite using sol-gel method. (LA)
2. Describe the principle of energy gap measurement in semiconductors. (SA)
3. Explain the working of a laser diode and its applications. (LA)
4. Discuss the effect of bending losses and prove experimentally**.** (LA)
5. Explain the B-H curve for ferromagnetic materials. (SA)

## L3 – Apply (LA)

1. Determine the magnetic moment of a given bar magnet using the vibration magnetometer.
2. Calculate the Hall voltage for a given semiconductor sample.
3. Measure the wavelength of a laser using diffraction grating.
4. Determine the dielectric constant of a given material experimentally.
5. Find the numerical aperture of a given optical fiber.

## L4 – Analyze (LA/SA/VIVA)

1. Compare the magnetic properties of ferromagnetic and paramagnetic materials.
2. Analyze the effect of temperature on the energy gap of semiconductors.
3. Interpret the P-E loop for a given ferroelectric material.
4. Compare core and cladding refractive indices in optical fibers.
5. Analyze the shape of a B-H curve for different materials.

## L5 – Create (LA)

1. Design an experimental setup to measure fiber attenuation under various bending radii.
2. Propose a method to synthesize nano-particles with controlled size and shape.
3. Develop a procedure for simultaneous measurement of multiple semiconductor properties.
4. Create a laser experiment to measure both wavelength and beam divergence.
5. Propose a method to measure dielectric constant at different frequencies.

**Chairperson**
**Board of Studies (Physics)**

**R25ES03 Problem Solving and Programming with C Lab 0 0 2 1**
**(Common to all Branches)**

**Course Objectives:** To work with an IDE to create, edit, compile, run and debug programs

1. To analyze the various steps in program development.
2. To develop programs to solve basic problems by understanding basic concepts in C like Operators, control statements etc.
3. To develop modular, reusable and readable C Programs using the concepts like functions, Arrays.
4. To write programs using the Dynamic Memory Allocation concept.

To create, read from and write to text and binary filesAt the end of the course, students will be able to:

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | |
|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | Dok |
| CO1 | Read, understand, and trace the execution of programs written in C language. | 2 | 2 | 2 | L1, L2 |
| CO2 | Select the right control structure for solving the problems .and demonstrate the application of arrays functions and strings | 3 | 3 | 3 | L2,L3 |
| CO3 | Develop Debug and Execute programs to demonstrate the applications of Pointers, Structures& Unions, and Files. | 3 | 3 | 3 | L2, L3 |

Board of Studies: Computer Science and Engineering

Approved in BOS No: 01, 12-09-2025

Approved in ACM No: 01, 26-09-2025

**Week 1: Practice Sessions**

a) Write a C program addition of two numbers.
b) Write a C program year is leap or not.
c) 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.
d) Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input

**Week 2: Simple Numeric Problems**

a) Write a program for finding the max and min from the three numbers.
b) Write the program for the simple, compound interest.
c) Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
d) Write a program that prints a multiplication table for a given number and the number of rows 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

e) Write a program that shows the binary equivalent of a given positive number between 0 to 255.

**Week 3: Expression Evaluation**

a) Write a C program the given number is strong or not?
b) Write a C program the given number is Armstrong or not?
c) A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
d) 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)
e) Write a program that finds if a given number is a prime number
f) Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
g) 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.
h) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
i) Write a C program to find the roots of a Quadratic equation.
j) Write a C program to calculate the following, where x is a fractional value. 1-x/2 +x^2/4 x^3/6
k) 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 is 5, then the program computes 1+5+25+125.

**Week 4: Arrays, Functions and Pointers**

a) Write a C program to find the minimum, maximum and average in an array of integers.
b) Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a single dimension array.
c) Write a C program that uses functions to perform the following:
    i. Addition of Two Matrices
    ii. Multiplication of Two Matrices
    iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be the same.
d) Write C programs that use both recursive and non-recursive functions
    i. To find the factorial of a given integer.
    ii. To find the GCD (greatest common divisor) of two given integers.
    iii. To find x^n
e) Write a program for reading elements using a pointer into an array and display the values using the array.
f) Write a program for display values reverse order from an array using a pointer.
g) Write a program through a pointer variable to sum of n elements from an array.

**Week 5: Strings**

a) Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b) Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c) Write a C program that uses functions to perform the following operations:
d) To insert a sub-string into a given main string from a given position.
e) To delete n Characters from a given position in a given string.

f) 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.)
g) Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
h) Write a C program to count the lines, words and characters in a given text.

**Week 6: Files**

a) Write a C program to display the contents of a file to standard output device.
b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
d) Write a C program that does the following: It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function) The program should then read all 10 values and print them back.
e) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

**Week 7: Miscellaneous**

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

i.
```
1
1 2
1 2 3
```
ii.
```
*
* *
* * *
```
iii.
```
1
2 3
4 5 6
```
iv.
```
*
**
* * *
* *
*
```
v.
```
1
2 2
3 3 3
4 4 4 4
```

**TEXTBOOKS:**

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

**REFERENCE BOOKS:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
5. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press

**Chairperson**
**Board of Studies (CSE)**

**R25HS02** **ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB** **0 0 2 1**
**(Common to all Branches CSE (AI&ML), CSE(DS), CSE(CS),ECE & MECH)**

**Learning Outcomes**:

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

1. Listen actively and identify important information in spoken texts
2. Interpret the speech and infer the intention of the speaker
3. Improve their accent for intelligibility
4. Speak fluently with clarity and confidence
5. Use the language in real life situations

| CO Code | Course Outcome Statements | Mapping with POs | | | DoK |
|---|---|---|---|---|---|
| | | PO9 | PO10 | PO11 | |
| CO1 | Listen actively and identify key information in spoken texts from diverse accents. | 3 | 2 | 3 | L1, L2 |
| CO2 | Interpret the speaker's intention and infer meaning from context. | 2 | 3 | 2 | L2, L4 |
| CO3 | Improve pronunciation and neutralize accent for greater intelligibility. | 3 | 2 | 1 | L2, L3 |
| CO4 | Speak fluently and confidently in both social and professional settings. | 3 | 2 | 2 | L3, L4 |
| CO5 | Apply English language skills creatively and appropriately in real-life situations. | 2 | 3 | 2 | L3, L4, L5 |

**Board of Studies: Department of English**
**Approved in BOS No:01**
**Approved in ACM No:01**

# Syllabus

**Exercise-1 CALL Lab**: 06hours

Instruction*:* Speech Sounds-Listening Skill - Importance – Purpose - Types- Barriers- Active Listening
Practice: Listening to Distinguish Speech Sounds (Minimal Pairs) - Testing Exercises

**ICS Lab**:

Instruction: Spoken and Written language - Formal and Informal English - Greetings - Introducing Oneself and Others
Practice*:* Any Ice-Breaking Activity **CO's-CO1**

**Exercise-2 CALL Lab**: 06hours

Instruction: Listening vs. Hearing - Barriers to Listening
Practice: Listening for General Information - Multiple Choice Questions - Listening Comprehension Exercises

**ICS Lab**:

Instruction: Features of Good Conversation – Strategies for Effective Communication
Practice: Role Play Activity - Situational Dialogues –Expressions used in Various Situations – Making Requests and Seeking Permissions – Taking Leave - Telephone Etiquette **CO's-CO2**

**Exercise-3 CALL Lab**:- 06hours

Instruction: Errors in Pronunciation – Tips for Neutralizing Mother Tongue Influence (MTI)
Practice: Differences between British and American Pronunciation –Listening Comprehension Exercises
**ICS Lab**:
Instruction: Describing Objects, Situations, Places, People and Events
Practice: Picture Description Activity – Looking at a Picture and Describing Objects, Situations, Places, People and Events *(*A wide range of Materials / Handouts are to be made available in the lab.) **CO's-CO3**

**Exercise-4 CALL Lab**:- 04hours
Instruction: Techniques for Effective Listening
Practice: Listening for Specific Details - Listening - Gap Fill Exercises - Listening Comprehension Exercises
*(*It is essential to identify a suitable passage with exercises for practice.*)*
**ICS Lab**:
Instruction: How to Tell a Good Story - Story Star- Sequencing-Creativity
Practice: Activity on Telling and Retelling Stories – Collage **CO's-CO4**

**Exercise-5 CALL Lab**:- 04hours
Instruction: Identifying the literal and implied meaning
Practice: Listening for Evaluation - Write the Summary – Listening Comprehension Exercises
*(*It is essential to identify a suitable passage with exercises for practice.*)*
**ICS Lab:**
Instruction: Understanding Non-Verbal Communication
Practice: Silent Speech - Dumb Charades Activity **CO's-CO5**

**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, 10$^{th}$ 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)

## REFERENCE BOOKS:

1. Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
2. Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities. Orient BlackSwan Pvt. Ltd.
3. Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge University Press
4. (2022). English Language Communication Skills – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.
5. Ur, Penny and Wright, Andrew. 2022. Five Minute Activities – A Resource Book for Language Teachers. Cambridge University Press.

## Web References

- BBC Learning English – https://www.bbc.co.uk/learningenglish
- Cambridge English – https://www.cambridgeenglish.org/learning-english
- British Council – https://learnenglish.britishcouncil.org

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 10% | 5% |
| L2 | 20% | 15% |
| L3 | 35% | 35% |
| L4 | 25% | 30% |
| L5 | 10% | 15% |
| **Total (%)** | **100** | **100** |

**Sample Questions (L1–L5)**

- **L1 – Remember**
  1. Define active listening.
  2. List types of barriers to listening.
  3. State three differences between British and American English.
  4. Name two non-verbal communication methods.
- **L2 – Understand**
  1. Explain why telephone etiquette is important in professional contexts.
  2. Differentiate between formal and informal greetings.
  3. Describe the purpose of minimal pairs in pronunciation practice.
  4. Interpret the meaning of "listening for evaluation."
- **L3 – Apply**
  1. Role-play a dialogue requesting permission in a formal setting.
  2. Perform a descriptive speech about a place using a provided picture.
  3. Tell a short story based on given keywords.
  4. Conduct a gap-fill listening exercise and complete the transcript
- **L4 – Analyze**
  1. Analyze the tone and intonation in a recorded speech.
  2. Compare two storytelling performances for clarity and engagement.
  3. Identify implied meanings in a listening passage.
  4. Evaluate how cultural context affects conversational style.

- **L5 – Evaluate/Create**
  1. Create a new role-play scenario for handling a customer complaint.
  2. Develop an original short story incorporating at least three idiomatic expressions.
  3. Design a non-verbal communication activity for peer practice.
  4. Compose a summary of a given speech, highlighting key points and inference.

**Chairperson**
**Board of studies (English)**

**R25ES19** **Python Programming Lab** **0 0 2 1**

**(Common to all Branches)**

**Prerequisites:** Students should install Python on Linux platform

**Course Objectives:**

1. To be able to introduce core programming basics and program design with functions using Python programming language.
2. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
3. To understand the high-performance programs designed to strengthen thepractical expertise.

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | | | Dok |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PS01 | PS02 | |
| CO1 | Student should be able to understand the basic concepts scripting and the contributions of scripting language | 3 | 3 | 3 | 3 | 3 | L1, L2 |
| CO2 | Ability to explore python especially the object-oriented concepts, and the built-in objects of Python. | 3 | 3 | 3 | 3 | 2 | L1, L2 L3 |
| CO3 | Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations. | 3 | 3 | 3 | 2 | 3 | L1, L2, L3 |

Board of Studies: Computer Science and Engineering.

Approved in BOS No: 01, 12-09-2025

Approved in ACM No: 01, 26-09-2025

Developing the following programs:

**Week1:**

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.

**Week2:**

3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”

**Week3:**

5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.

**Week4:**

7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.

**Week5:**

9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [ Formula: c/5 = f-32/9 ]

**Week6:**

10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.

**Week7:**

12. Write a python program to find factorial of a number using Recursion.

**Week8:**

13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).

**Week9:**

14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.

**Week10:**

15. Write a python program to define a module and import a specific function in that module to another program.

**Week11**

16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

**Week12**

17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.

**Week13:**

18. Write a Python class to convert an integer to a roman numeral.

**Week14:**

19. Write a Python class to implement pow(x, n)

**Week15:**

20. Write a Python class to reverse a string word by word.

**Chairperson**
**Board of Studies (CSE)**

**R25BS04 DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS 3 1 0 3**
**(Common to CSE, CSE(AI&ML), CSE(DS), CSE(CS), ECE, EEE, MECH)**

**Course Objectives:**

1. Understand and solve first-order ordinary differential equations and apply them to real-life problems.
2. Solve higher-order ordinary differential equations using analytical methods.
3. Apply Laplace transform techniques to solve initial value problems and evaluate integrals.
4. Analyze vector functions using differentiation to compute gradient, divergence, curl, and related properties.
5. Apply vector integration theorems to evaluate line, surface, and volume integrals.

**Course Outcomes:**

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

| Course Code | Course Outcomes | Mapping with POs | | | Dok |
|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | |
| CO1 | Solve and apply first-order ODEs to physical and engineering problems. | 3 | 3 | 3 | L1,L2 |
| CO2 | Solve higher-order linear ODEs with constant coefficients using analytical methods. | 3 | 2 | 2 | L2–L3 |
| CO3 | Use Laplace transforms to solve initial value problems and evaluate definite integrals. | 3 | 3 | 2 | L2,L3.L4 |
| CO4 | Apply vector differentiation to compute gradient, divergence, curl, and related properties. | 3 | 3 | 2 | L2–J3 |
| CO5 | Evaluate line, surface, and volume integrals using vector integration theorems. | 3 | 2 | 3 | L2,L3,L4 |

## SYLLABUS

**UNIT-I: First Order ODE** **8 Hours**

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (Cartesian Coordinates & polar coordinates). Applications: Newton's law of cooling, Law of natural growth and decay. **COs: CO1**

**Self-learning Topics:** Solving DE of first order by different methods

**UNIT-II: Ordinary Differential Equations of Higher Order** **10 Hours**

Second and higher order linear differential equations with constant coefficients: Complementary function – Particular Integral – concept of inverse differential operator Non-Homogeneous terms of the type $e^{ax}$, sin , cos$ax$,polynomials in $x$, $e^{ax}V(x)$and $xV(x)$, method of variation of parameters **COs: CO2**

**Self-learning Topics:** Evaluation of homogenous and Non –Homogenies equations

**UNIT-III: Laplace Transforms** **13 Hours**

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

**COs: CO3**

**Self-learning Topics**: Finding the Differentiation and Integration by Laplace Transforms

**UNIT-IV: Vector Differentiation** **10 Hours**

Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Vector Identities and Vector Operators, Scalar potential functions, Solenoidal and Irrotational vectors. **COs: CO4**

**Self-learning Topics**: Evaluation of Vector Differential functions

**UNIT-V: Vector Integration** **10 Hours**

Line Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications. **COs: CO5**

**Self-learning Topics**: Evaluation of **Vector Integral functions**

**Textbooks:**

1. B.S. Grewal, Higher Engineering Mathematics, KhannaPublishers,36th Edition,2010
2. R. K. Jainand S .R. K. Iyengar ,Advanced Engineering Mathematics, Narosa Publications, 5thEdition,2016.

**3. Reference Books:**

4. Erwin Kreyszig, Advanced Engineering Mathematics,9th Edition, John Wiley&Sons,2006.
5. G. B. Thomasand R. L. Finney,Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.
6. H.K.DassandEr.RajnishVerma, Higher Engineering Mathematics, S Chandand Company Limited,NewDelhi.
7. N.P.BaliandManishGoyal,Atext book of Engineering Mathematics ,Laxmi Publications, Reprint,2008.

**eBooks& Reference Books:**

8. **"Advanced Engineering Mathematics" by Erwin Kreyszig**
   Comprehensive coverage of ODEs, Laplace transforms, and vector calculus.
   Google Books Preview
9. **"Differential Equations with Boundary-Value Problems" by Dennis Zill**
   Excellent for step-by-step solution methods.
   Google Books Preview
10. **"Vector Calculus" by Jerrold E. Marsden & Anthony Tromba**
    Standard reference for vector differentiation and integration.
    Google Books Preview

**Web References:**

1. **NPTEL – Differential Equations for Engineers**
   IIT Kharagpur video lectures covering first-order, higher-order ODEs, Laplace transforms.
   https://nptel.ac.in/courses/111/105/111105045
2. **NPTEL – Multivariable Calculus & Vector Calculus**
   IIT Kanpur lectures on vector differentiation, integration, and theorems.
   https://nptel.ac.in/courses/111/104/111104092
3. **Paul's Online Math Notes – DE & Vector Calculus**
   https://tutorial.math.lamar.edu
4. **MIT OpenCourseWare – Differential Equations (18.03)**
   Complete lecture videos, notes, and assignments.
   https://ocw.mit.edu/courses/mathematics/18-03sc-differential-equations-fall-2011/
5. **Khan Academy – Differential Equations & Vector Calculus**
   Short visual-based tutorials for quick conceptual understanding.https://www.khanacademy.org/math

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 10% | 5% |
| L2 | 25% | 20% |
| L3 | 50% | 50% |
| L4 | 10% | 15% |
| L5 | 5% | 10% |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answer Questions – By Cognitive Level**

**L1 – Remember**

1. Define exact differential equation.
2. State Newton's law of cooling.
3. Write the Laplace transform of eate^{at}eat.
4. Define gradient and curl.
5. State Gauss's divergence theorem.

**L2 – Understand**

1. Explain the method to solve a Bernoulli equation.
2. Describe the concept of complementary function and particular integral.
3. Explain the first shifting theorem of Laplace transforms.
4. Interpret the meaning of divergence in vector calculus.
5. Explain the significance of Stokes's theorem.

**L3 – Apply**

1. Solve (2xy+y2)dx+(x2+2xy)dy=0(2xy + y^2)dx + (x^2 + 2xy)dy = 0(2xy+y2)dx+(x2+2xy)dy=0.
2. Solve y′′−3y′+2y=e2xy'' - 3y' + 2y = e^{2x}y′′−3y′+2y=e2x.
3. Find the Laplace transform of te−3tsin⁡(2t)t e^{-3t} \sin(2t)te−3tsin(2t).
4. Calculate the curl of $\vec{F}$=yi^+zj^+xk^\vec{F} = y\hat{i} + z\hat{j} + x\hat{k}F=yi^+zj^+xk^.
5. Evaluate ∫C(x dy−y dx)\int_C (x\,dy - y\,dx)∫C(xdy−ydx) where C is a circle.

**L4 – Analyze**

1. Determine whether the given vector field is irrotational.
2. Compare the method of undetermined coefficients with variation of parameters.
3. Analyze the solution of Newton's law of cooling for different cooling rates.
4. Determine if a given differential equation is exact and make it exact if necessary.
5. Evaluate a line integral using both direct and Green's theorem methods and compare results.

**L5 – Evaluate/Create**

1. Develop a model using first-order ODE for population growth.

2. Create a Laplace transform-based solution for an RLC circuit.
3. Formulate a problem in heat conduction and solve using vector calculus.
4. Design a problem integrating divergence theorem with a physical application.
5. Construct an initial value problem and solve using Laplace transform and convolution theorem.

**Chairperson**
**Board of Studies (Mathematics)**

**R25BS05 ENGINEERING CHEMISTRY 3 0 0 3**

(Common to CSE, CSE(DS), CSE(AI&ML), CSE (CS), EEE, MECH, ECE)

**Course Objectives:**

1. To impart knowledge on water quality, its treatment methods, and prevention of boiler troubles.
2. To introduce fundamental concepts of electrochemistry and corrosion, along with prevention methods.
3. To explain various energy sources including batteries, fuel cells, fossil fuels, and synthetic fuels.
4. To familiarize students with different polymers, their types, properties, and applications.
5. To introduce advanced functional materials and their engineering and industrial applications.

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

| Course Code | Course Outcomes | Mapping with Pos | | | Dok |
|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | |
| CO1 | Analyze water hardness, apply water treatment techniques, and explain methods for preventing boiler troubles. | 3 | 3 | 2 | L1, L2 |
| CO2 | Apply electrochemical concepts to measure electrode potentials, determine pH, and suggest corrosion control measures. | 3 | 2 | 3 | L2, L3 |
| CO3 | Classify and explain batteries, fuel cells, fuels, and synthetic fuels with their applications. | 3 | 3 | 3 | L2, L3 |
| CO4 | Classify polymers, explain their synthesis mechanisms, and assess their applications in engineering. | 3 | 3 | 2 | L1, L4 |
| CO5 | Explain the properties and applications of smart materials, biosensors, and spectroscopic techniques in various industries. | 3 | 3 | 3 | L5, L6 |

## SYLLABUS

**UNIT-I: Water and its treatment**

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break- point chlorination. Defluoridation - Nalgonda technique.

Boiler troubles: Introduction to Scale, Sludges and Caustic embrittlement. Internal treatment of boiler feed water - Calgon conditioning, Phosphate conditioning, Colloidal conditioning. External treatment methods - Softening of water by ion- exchange processes. Desalination of brackish water – Reverse Osmosis. **COs-CO1**

**UNIT-II: Electrochemistry and Corrosion**

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation), electrochemical cell - Galvanic cell, cell representation, EMF of cell - Types of electrodes, reference electrodes, Construction, working principle- Primary reference electrode - Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Construction, working and determination of pH of unknown solution using SHE and Calomel electrode.

**Corrosion:** Introduction- Definition, causes and effects of corrosion – Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods. **CO's-CO2**

**UNIT–III: Energy sources:**

**Batteries:** Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion battery. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

**Fuels:** Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulongs formula - Numerical problems.

**Fossil fuels:** Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking- Moving bed catalytic cracking. LPG and CNG composition and uses.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen. **COs-CO3**

**UNIT - IV: Polymers:**

**Definition -** Classification of polymers: Based on origin and tacticity with examples – Types of polymerization-Addition: free radical (mechanism), ionic and co-ordination polymerisation (reactions and examples) and condensation polymerization.

**Plastics, Elastomers and Fibers:** Definition and applications (PVC, Buna-S, Nylon-6, 6). Differences between thermo plastics and thermo setting plastics, Fiber reinforced plastics (FRP).

**Conducting polymers:** Definition and Classification with examples - Mechanism of conduction in trans- poly-acetylene and applications of conducting polymers.

**Biodegradable polymers:** Polylactic acid and its applications**.** **COs-CO4**

**UNIT-V- Advanced Functional Materials:**

**Smart materials:** Introduction, Classification with examples - Shape Memory Alloys – Nitinol, Piezoelectric materials – quartz and their engineering applications.

Biosensor - Definition, Amperometric Glucose monitor sensor**.**

**Interpretative spectroscopic** applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution under Control- CO sensor (Passive Infrared detection).

**Lubricants:** Introduction, Types, classification, Properties- Viscosity, flash point, fire point, cloud point, pour point. **COs-CO5**

Board of Studies : Department of Chemistry
Approved in BOS No: 11th, September, 2025
Approved in ACM No: 01

**Text books:**

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkatan Ramana Reddy and Rath, Cengage learning,2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.

4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

**Reference Books:**

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011).

**Web References:**

1. **NPTEL – Engineering Chemistry (IIT Madras / Bombay)**
   Video lectures by premier IIT faculty on entire syllabus topics.
   https://nptel.ac.in/courses/122103029
2. **LibreTexts – Chemistry for Engineers**
   Free, peer-reviewed, and accessible content on water chemistry, electrochemistry, polymers, etc. https://chem.libretexts.org
3. **GeeksforGeeks – Engineering Chemistry Concepts**
   Useful for quick concept reviews and practical applications (e.g., corrosion, fuel cells, polymers). https://www.geeksforgeeks.org/engineering-chemistry
4. **Wiley Online Library – Open Access Chemistry Articles**
   Articles on smart materials, biodegradable polymers, and engineering applications.
   https://onlinelibrary.wiley.com
5. **ScienceDirect – Applied Chemistry for Engineers**
   Latest research articles on corrosion, fuel chemistry, and environmental chemistry.
   https://www.sciencedirect.com

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 40 | 20 |
| L2 | 30 | 30 |
| L3 | 30 | -- |
| L4 | -- | 30 |
| L5 | -- | 20 |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

**L1 – Recall (Short Answer Type)**

1. Define *temporary hardness* of water. **(SA)**
2. List different types of corrosion. **(SA)**
3. State the standard electrode potential of hydrogen electrode. **(SA)**
4. Name any two biodegradable polymers. **(SA)**
5. Write the formula for calculating calorific value. **(SA)**

**L2 – Understand**

1. Explain the process of lime-soda water treatment with reactions. **(LA)**
2. Describe the mechanism of galvanic corrosion. **(LA)**
3. Explain the working of a proton-exchange membrane (PEM) fuel cell. **(LA)**
4. Discuss the differences between thermoplastics and thermosetting plastics. **(SA)**
5. Explain the principle of UV–Visible spectroscopy. **(SA)**

**L3 – Apply**

1. Calculate the hardness of a water sample given EDTA titration data. **(LA)**

2. Apply Nernst equation to find the potential of a $Zn^{2+}/Zn$ electrode. **(LA)**
3. Determine the efficiency of a lead-acid battery from given discharge data. **(LA)**
4. Apply Langelier saturation index to predict scale formation in a water sample. **(SA)**
5. Evaluate the calorific value of a coal sample from bomb calorimeter readings. **(LA)**

**L4 – Analyze**

1. Compare hot lime soda and cold lime soda processes for water softening. **(LA)**
2. Analyze the reasons for intergranular corrosion in stainless steel. **(LA)**
3. Compare and contrast Fischer–Tropsch and Bergius processes for synthetic fuel production. **(LA)**
4. Analyze the advantages of conducting polymers over conventional polymers. **(SA)**
5. Examine the role of biosensors in environmental monitoring. **(SA)**

**L5 – Create**

1. Design a hybrid water treatment process combining reverse osmosis and ion exchange for municipal water supply. **(LA)**
2. Develop a corrosion prevention plan for an offshore oil rig. **(LA)**
3. Propose an innovative biodegradable polymer blend for surgical implants and justify the selection. **(LA)**
4. Formulate an energy storage system integrating hydrogen fuel cells with solar power. **(LA)**
5. Design a spectroscopic analysis procedure for detecting trace heavy metals in water samples. **(LA)**

**Chairperson**
**Board of studies (Chemistry)**

R25ES05 **DATA STRUCTURES** **3 0 0 3**

(Common to CSE, CSE(AI&ML), CSE(DS), CSE(CS), ECE, EEE)

**Prerequisites:** A course on **"** Problem Solving and Programming with C".

**Course Objectives:**

1. Understanding of fundamental data structures and algorithms.
2. To understand importance of data structure in context of writing efficient program.
3. Create and manage linked lists to efficiently organize and manipulate data, emphasizing memory efficiency.
4. Implement and apply stacks to manage program flow and solve problems involving expression evaluation and backtracking.
5. Explore basic concepts of hashing and apply it to solve problems requiring fast data retrieval and management.
6. To solve problems using data structures such as binary trees, binary search trees, and graphs.

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | | | Dok |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PS01 | PS02 | |
| CO1 | Explain the role of linear data structures in organizing and accessing data efficiently in algorithms | 3 | 3 | 2 | 3 | 2 | L1 |
| CO2 | Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. | 3 | 3 | 3 | 3 | 2 | L1, L2 |
| CO3 | Apply queue-based algorithms for distinguish between deques and priority queues, and apply them appropriately to solve data management challenges, and apply Hash based solutions for specific problems. | 3 | 3 | 3 | 3 | 2 | L2, L3 |
| CO4 | Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. | 3 | 3 | 2 | 3 | 2 | L3, L4 |
| CO5 | Implement operations on Binary tree, Demonstrate the representation and traversal techniques of graphs and their applications. | 3 | 3 | 3 | 3 | 2 | L4, L5 |

# SYLLABUS

**UNIT- I**: **12 Hours**

**Introduction to Data Structures**: Types of data Structures.

**Linked Lists**: List, Type of Linked list-single linked list, Double linked list and Circular linked list, its representation and operations, Advantages and disadvantages, Comparing arrays and linked lists, Application. **COs–CO1**

Self-Learning Topics: Likened list operations

**UNIT- II:** **10 Hours**

**Stacks**: Introduction to Stacks, properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation (Prefix, Postfix, Infix, Towers of Hanoi and Recursion).

**Queues:** Introduction to Queues, properties and operations, implementing queues using arrays and linked lists, Applications. **COs–CO2**

Self-Learning Topics: Types of Stacks and different types of Queue

**UNIT- III:** **12 Hours**

**Dictionaries:** linear list representation and its operation, skip list representation and its operations. **Hashing:** Introduction, hash functions, types of hash functions, hash table and its representation, collision resolution technics-closed addressing (separate chaining), open addressing (linear probing, quadratic probing, double hashing, rehashing), Application.

**COs–CO3**

Self-Learning Topics: Different types of Queues

**UNIT- IV:** **14 Hours**

**Trees:** Introduction to Trees, Binary Trees and Its Properties, Representation of Binary Trees using Arrays and Linked List, types of Binary trees, tree Traversals, Binary Search Trees and its operations, AVL Tree and its operations, Application.

**Graphs:** introduction, types of graphs, representation of graphs, Graph Implementation Methods. Graph Traversals, Application. **COs–CO4**

Self-Learning Topics: Height Balanced Tree (AVL)

**UNIT- V:** **14 Hours**

**Pattern Matching and Tries:** Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, Standard Tries, Compressed Tries, and Suffix tries.

**Searching Techniques:** Linear Search, Binary Search.

**Sorting:** Bubble Sort, Insertion Sort, and Selection Sort. **COs–CO5**

Self-Learning Topics: Pattern Matching .

Board of Studies: Computer Science and Engineering.

Approved in BOS No: 01, 12-09-2025

Approved in ACM No: 01, 26-09-2025

**TEXT BOOKS:**

1. 'Data Structures and Algorithm Analysis in C' by Mark Allen Weiss, Pearson.
2. 'Introduction to Algorithms' by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press.
3. 'Data Structures Using C' by Reema Thareja, Oxford University Press.

**REFERENCE BOOKS:**

1. Algorithms, Part I and II' by Robert Sedgewick and Kevin Wayne, Addison-Wesley.
2. Data Structures and Algorithms Made Easy' by Narasimha Karumanchi, CareerMonk Publications.

**Web References:**

1. http://www.hackerrank.com/domains/datastructures
2. http://www.github.com/topics/data_structures_c
3. http://nptel.ac.in/courses
4. http://www.cslibrary.stanford.edu

Internal Assessment Pattern

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 35 | --- |
| L2 | 40 | --- |
| L3 | 25 | 40 |
| L4 | -- | 35 |
| L5 | -- | 25 |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of Various Cognitive Levels**
**L1: Remember**

1. hat are the operations on single linked list?
2. What are the principles of stack?
3. What are the operations on Queue?
4. Describe the types of data structures?
5. What is the disadvantage of linked list over an array?

**L2: Understand**

5. Explain Bubble sort, Insertion sort algorithm with examples?
6. Explain the Stack, Queue ADT's with example?
7. Write a algorithm to delete node from a list.
8. Describe Quick sort algorithm, with example and find total no of comparisons made?
9. Describe the Insertion sort Algorithm with example?

**L3: Apply**

1. Convert infix to prefix and postfix expression with example?
2. Write an algorithm for evaluating a postfix expression to prefix expression?
3. Illustrate the given infix expression (A+B ^C+(D*E)^(F+G)) into post fix and evaluate the same using stack? A=3, B=4, C=2, D=6, E=4, F=1, G=8
4. Search an element in a Tree Recursively.
5. Write a C program to count the number of nodes in a Binary tree.

**L4: Analyze**

1. Write an algorithm to construct Binary Search Tree with no duplicate values.
2. Inspect Single Linked List operations to maintain student marks obtained for various subjects.
3. Write a C program to implement Hash Table.

**L5: Evaluating**

1. C program to solve the magic squares puzzle without using Recursion.
2. C program to represent Graph using incidence matrix.
3. Write a C program to implement Vector.

**Chairperson**
**Board of Studies (CSE)**

**R25ES02 Basic Electrical Engineering 3 0 0 3**

**(**Common to CSE, CSE(AI&ML), CSE(Data Science), CSE(Cyber Secuirity) & ECE )

**Prerequisites**: Mathematics

**Course Objectives:**

1. Provide foundational knowledge of DC and AC electrical circuits and their analysis.
2. Introduce fundamental laws and theorems used in electrical engineering.
3. Explain the working principles and performance of transformers and electrical machines.
4. Develop skills to analyze and solve real-world electrical engineering problems.
5. Familiarize students with electrical installations, safety measures, and energy management.

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

| CO code | Course outcomes | Mapping with POs and PSOs | | | | | DoK |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PSO1 | PSO2 | |
| CO1 | Analyze DC circuits using fundamental laws and theorems. | 2 | 3 | 3 | 3 | 2 | L1,L2, L3 |
| CO2 | Interpret and solve single-phase and three-phase AC circuits and able to analyse different types of powers. | 3 | 2 | 2 | 2 | 2 | L1,L2, L3,L4 |
| CO3 | Explain the construction, operation, and performance of transformers and is able to analyse Auto transformers. | 2 | 3 | 2 | 2 | 3 | L1, L2, L4 |
| CO4 | Describe the working of DC, induction, and synchronous machines and also performance characteristics. | 3 | 2 | 2 | 2 | 3 | L1, L2, L4 |
| CO5 | Apply knowledge of electrical installations, wiring systems, and energy calculations. | 2 | 3 | 2 | 3 | 3 | L1,L2, L3,L4 |

**SYLLABUS**

**UNIT-I: 13 Hours**

**D.C. Circuits:** Electrical circuit elements (R, L and C), voltage and current sources, KVL & KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits. **CO's - CO1**

**UNIT-II: 13 Hours**

**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 and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections. **CO's - CO2**

**UNIT-III: 11 Hours**

**Transformers:** Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

**CO's - CO3**

**UNIT-IV: 12 Hours**

**DC Machines:** Construction and working principle of dc machine, performance characteristics of dc shunt machine.

**AC Machines**: Generation of rotating magnetic field, Construction and working of a three-phase induction motor. Construction and working of Single-phase induction motor. Construction and working principle of synchronous generator. **CO's - CO4**

**UNIT-V: 10 Hours**

**Electrical Installations:** Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing and types, Elementary calculations for energy consumption, power factor improvement and battery backup. **CO's - CO5**

Board of Studies : Electrical and Electronics Engineering.
Approved in BOS No: 01, XXXX
Approved in ACM No: 01.

**TEXT BOOKS:**

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

**REFERENCE BOOKS:**

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Web References

- NPTEL – Basic Electrical Engineering: https://nptel.ac.in/courses/108/105/108105105/

- All About Circuits: https://www.allaboutcircuits.com/
- Electrical4U: https://www.electrical4u.com/
- Electronics Tutorials: https://www.electronics-tutorials.ws/
- Khan Academy – Electrical Engineering: https://www.khanacademy.org/science/electrical-engineering

eBooks

- Basic Electrical Engineering by D.P. Kothari & I.J. Nagrath
- Electrical Engineering Fundamentals by Vincent Del Toro
- Basic Electrical Engineering by M.S. Naidu & S. Kamakshaiah
- Introduction to Electrical Engineering by Mulukutla S. Sarma
- Principles of Electrical Engineering by V.K. Mehta

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 20% | 10% |
| L2 | 30% | 25% |
| L3 | 30% | 35% |
| L4 | 20% | 30% |
| L5 | 0% | 0% |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

## L1 – Recall (SA)

1. State Kirchhoff's Current Law.
2. Define RMS value of an AC signal.
3. List types of losses in a transformer.
4. Name the main parts of a DC machine.
5. Mention types of earthing systems.

## L2 – Understand (SA/LA)

1. Explain the difference between series and parallel resonance. (LA)

2. Describe the working principle of a single-phase transformer. (LA)
3. Explain the star-delta connection in three-phase circuits. (SA)
4. Describe the operation of a synchronous generator. (LA)
5. Discuss the importance of power factor improvement. (SA)

## L3 – Apply (LA)

1. Calculate current in a given DC network using Thevenin's theorem.
2. Determine power factor in a single-phase RL circuit with given data.
3. Calculate efficiency of a transformer given test results.
4. Determine energy consumption for a household load over a month.
5. Apply KVL and KCL to a given electrical circuit.

## L4 – Analyze (LA)

1. Compare auto-transformers with two-winding transformers.
2. Analyze performance characteristics of a DC shunt motor.
3. Compare star and delta configurations for given load conditions.
4. Analyze causes of low efficiency in an induction motor.
5. Evaluate safety considerations in electrical installations.

## L5 – Create (LA)

1. Design a simple electrical wiring layout for a small workshop.
2. Develop an energy-saving plan for a residential building.
3. Create a troubleshooting guide for common transformer faults.
4. Propose modifications to improve motor efficiency.
5. Design an earthing system for a substation.

**Chairperson**
**Board of Studies (EEE)**

**R25ES07 COMPUTER AIDED ENGINEERING DRAWING 2 0 2 3**

**(Common to EEE, MECH, ECE, CSE, CSE (CS), CSE (AI&ML), CSE (DS))**

**Course Objectives:**

1. To introduce students to the fundamentals of engineering drawing and BIS drawing standards.
2. To develop the ability to visualize and represent objects in orthographic, sectional, and isometric views.
3. To impart skills to create 2D engineering drawings using conventional methods and CAD software.
4. To teach the development of surfaces for manufacturing and fabrication processes.
5. To enable students to produce accurate engineering drawings for real-world mechanical components and assemblies.

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

| Course Code | Course outcomes | Mapping with POs and PSOs | | | | | DoK |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PSO1 | PSO2 | |
| CO1 | Understand and apply the principles of orthographic and isometric projections. | 3 | 2 | 3 | 2 | 2 | L1,L2,L3 |
| CO2 | Create sectional views and dimensioned drawings using BIS standards. | 3 | 3 | 3 | 3 | 3 | L2,L3,L4 |
| CO3 | Use CAD software to generate 2D engineering drawings. | 3 | 2 | 3 | 3 | 2 | L2,L3, L4 |
| CO4 | Visualize and construct solid models from 2D views. | 3 | 3 | 2 | 3 | 2 | L3,L4 |
| CO5 | Interpret and produce engineering drawings of mechanical components and assemblies for industrial applications. | 3 | 2 | 2 | 3 | 3 | L3,L4 |

**SYLLABUS**

**UNIT – I: Introduction to Engineering Drawing (Conventional) 16 HOURS**

Principles of Engineering Drawing and their significance - Size of drawing sheets, Types of lines, Dimensioning, Title block - BIS Conventions to Lettering.

Geometrical Constructions, Scales, Plain and Diagonal, Conic Sections including the Rectangular Hyperbola, General method only. Cycloid, Epicycloid and Hypocycloid. **CO's-CO1**

**UNIT - II: Orthographic Projections**

**(Conventional and Computer Aided) 16 HOURS**

Principles of Orthographic Projections, Conventions, Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections, points, lines and planes. Introduction to Computer aided drafting, views, commands and conics. **CO's-CO2**

**UNIT – III: Projections of Regular Solids**

**(Conventional and Computer Aided) 16 HOURS**

Auxiliary Views, Sections or Sectional views of Right Regular Solids, Prism, Cylinder, Pyramid, Cone, Auxiliary views, Computer aided projections of solids, sectional views. **CO's-CO3**

**UNIT – IV: Development of Surfaces (Conventional): 12 HOURS**
Prism, Cylinder, Pyramid and Cone. **CO's-CO4**

**UNIT – V: Isometric Projections**

**(Conventional and Computer Aided) 15 HOURS**

Principles of Isometric Projection, Isometric Scale, Isometric Views, Conventions, Isometric Views of Lines, Plane Figures, Simple and Compound Solids, Isometric Projection of objects having non, isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice- versa, Conventions. Conversion of orthographic projection into isometric view. **CO's-CO5**

**Note:**

1. The End Semester Examination will be in conventional mode.
2. CIE – I will be in conventional mode.
3. CIE – II will be using Computer.

Board of Studies: Mechanical Engineering
Approved in BoS No: 01 12th August 2025
Approved in ACM No: 01

**TEXT BOOKS:**

1. Engineering Drawing, N.D. Bhatt, Charotar, 54th Edition, 2023.
2. Engineering Drawing and graphics Using AutoCAD, T. Jeyapoovan and Vikas, S. Chand and company Ltd., 3rd Edition, 2010.

**REFERENCE BOOKS:**

1. Engineering Drawing, Basant Agrawal and C.M. Agrawal, McGraw Hill, 3rd Edition, 2019.
2. Engineering Graphics and Design, WILEY, John Wiley and Sons Inc, 3rd Edition, 2020.

3. Engineering Drawing, M. B. Shah and B.C. Rane, Pearson, 2nd Edition, 2009.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford, 1st Edition, 2015.
5. Computer Aided Engineering Drawing, K. Balaveera Reddy, CBS Publishers, 2nd Edition, 2015.

**WEB REFERENCES:**

1. NPTEL – Engineering Drawing: https://nptel.ac.in/courses/105104148
2. AutoCAD Tutorials – CADTutor: https://www.cadtutor.net/tutorials/autocad/
3. MIT OpenCourseWare – Technical Drawing: https://ocw.mit.edu/courses/mechanical-engineering/technical-drawing-and-design/
4. Autodesk Learning Hub: https://knowledge.autodesk.com/
5. Engineering Drawing Basics: https://www.engineeringdrawing.org/

**E- Books**

1. Engineering Drawing by N.D. Bhatt (Latest Edition)
2. Engineering Graphics and Design by WILEY
3. Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan
4. Technical Drawing with Engineering Graphics by Giesecke et al.
5. Computer Aided Engineering Drawing by K. Balaveera Reddy

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 20% | 10% |
| L2 | 30% | 25% |
| L3 | 30% | 35% |
| L4 | 15% | 20% |
| L5 | 5% | 10% |
| **Total (%)** | **100** | **100** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

**L1 – Recall**

- Define orthographic projection. (SA)
- List different types of conic sections. (SA)
- State the principle of isometric projection. (SA)
- Identify the types of scales used in engineering drawing. (SA)

**L2 – Understand**

- Explain the difference between first-angle and third-angle projection methods. (LA)
- Describe the process of drawing a cycloid curve. (LA)
- Explain the use of auxiliary planes in orthographic projection. (SA)
- Describe the conventions used in sectional views. (SA)

**L3 – Apply**

- Draw the orthographic projections of a hexagonal prism with its axis inclined to HP. (LA)
- Using CAD, create the front, top, and side views of a given solid. (LA)
- Develop the lateral surface of a cone of given dimensions. (SA)
- Generate isometric views for a simple mechanical part. (LA)

**L4 – Analyze**

- Compare conventional and CAD-based drafting methods in terms of accuracy and time. (LA)
- Evaluate the role of dimensioning standards in engineering drawings. (SA)
- Analyze the difference in representation between isometric projection and isometric drawing. (SA)
- Study a given mechanical drawing and identify missing or incorrect features. (LA)

**L5 – Create**

- Design an assembly drawing of a simple mechanical component using CAD. (LA)
- Create a 3D model from given orthographic views in CAD. (LA)
- Develop a CAD template for orthographic and isometric views of a standard part. (LA)
- Prepare a working drawing including all views, dimensions, and sectional details for a machine part. (LA)

Chairperson
Board of Studies (ME)

**R25BS06** **ENGINEERING CHEMISTRY LAB** **0 0 2 1**

(Common to CSE, CSE(DS), CSE(AI&ML), CSE (CS), EEE, MECH, ECE)

**Course Objectives:**

1. To develop practical skills in analytical chemistry techniques such as volumetric, conductometric, potentiometric, and colorimetric methods.
2. To provide hands-on experience in determining chemical concentrations and material properties.
3. To familiarize students with the preparation of polymers and study of corrosion.
4. To introduce applications of chemistry in modern technology through virtual experiments.
5. To encourage scientific thinking and analytical problem-solving in laboratory settings.

**Course Outcomes**

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

| Course Code | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | DoK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | Estimation of Hardness of water by EDTA, concentration of Unknown acids by Conductometry and Potentiometry | 3 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | L1, L2 |
| CO2 | Determination of concentration of Unknown acids by pH metrry and some properties of lubricating Oils. | 3 | 3 | 2 | 2 | 3 | 1 | 1 | 1 | 2 | L2, L3 |
| CO3 | Determination of rate of corrosion of metals, and preparation of polymers. | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 2 | L3 |

Board of Studies: Department of Chemistry

Approved in BOS No: 11th, September, 2025

Approved in ACM No: 01

**Week-1**

1. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method. **COs:CO1**

**Week-2 & 3**

**Conductometry:**

1. Estimation of the concentration of strong acid by Conductometry. **COs:CO1**
2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry. **COs:CO1**

**Week-4 & 5**

**Potentiometry:**

1. Estimation of concentration of $Fe^{+2}$ ion by Potentiometry using KMnO4. **COs:CO1**
2. Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone. **COs:CO1**

**Week-6**

**pH Metry: 1.** Determination of an acid concentration using pH meter. **COs: CO2**

**Week-7**

1. Estimation of amount of Ferrous ion ($Fe^{+2}$) by Dichrometry.

**Week- 8**

1. Determination of Acid value of Oil sample.
2. Estimation of Viscosity of lubricating Oil sample **COs: CO2**

**Week-9 & 10**

**Preparations:**

1. Preparation of Bakelite. COs:CO5
2. Preparation of Nylon-6,6. **COs: CO3**

**Week-11:** Corrosion:

1. Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

**COs: CO3**

**Virtual lab experiments:**

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

   **Reference Website**: https://vlab.amrita.edu/?sub=2

**Reference Books:**

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel'stextbookofpracticalorganicchemistry5thedition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

**Sample Short and Long Answers questions of Various Cognitive Levels**

## L1 – Recall (SA)

1. Define complexometric titration.
2. List two polymers prepared in the lab.
3. Mention the types of corrosion.
4. Name the indicator used in EDTA titration for hardness.

## L2 – Understand (SA/LA)

1. Explain the principle of conductometric titration. (LA)
2. Describe the working of a pH meter. (SA)
3. Explain the role of inhibitors in corrosion prevention. (LA)
4. Describe the quinhydrone electrode in potentiometry. (SA)

## L3 – Apply (LA)

1. Determine hardness of a given water sample using EDTA method.
2. Calculate concentration of strong and weak acid mixture from conductometric readings.
3. Estimate $Fe^{2}$ ion concentration using potentiometry.
4. Prepare Nylon 6,6 and describe the reaction.
5. Use pH meter to determine unknown acid concentration.

## L4 – Analyze (LA)

1. Compare conductometric and potentiometric titrations.
2. Analyze how polymer structure affects its properties.
3. Examine factors affecting corrosion rate.
4. Compare efficiency of different corrosion inhibitors.

## L5 – Create (LA)

1. Design a virtual experiment to test a new corrosion inhibitor.
2. Develop an experimental plan to study effect of pH on corrosion rate.
3. Propose a polymer synthesis route for biodegradable plastics.
4. Design a small-scale fuel cell demonstration kit

**Chairperson**
**Board of Studies (Chemistry)**

R25ES08 **Data Structures Lab** **0 0 2 1**

**(Common to CSE, CSM, CSD, CSC, ECE &EEE)**

**Course Objectives:**

The course aims to give students hands – on experience and train them on the concepts of the C- programming language.

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | |
|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | Dok |
| CO1 | Explain the role of linear data structures in Organizing and accessing data efficiently in algorithms. | 3 | 3 | 3 | L1, L2 |
| CO2 | Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems& Queues. | 3 | 3 | 3 | L2, L3, L4 |
| CO3 | Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation, Graphs & Trees. | 3 | 3 | 3 | L4, L5 L6 |

Board of Studies : Computer Science and Engineering

Approved in BOS No: 01, 12-09-2025

Approved in ACM No: 01, 26-09-2025

**Developing the following programs**

**List of Experiments:**

1. Write a program that uses functions to perform the following operations on singly linked list
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list
   i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.
   i) Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using
   i) Arrays ii) Linked List
5. Write a program that implement Queue (its operations) using
   i) Arrays ii) Linked List
6. Write a program to implement the Dictionaries operations.
7. Write a program to implement the following Hash Functions:
   i) Division Method, ii) Multiplication Method, iii) Mid-square Method, iv) Folding
8. Write a program to implement the tree traversal methods (Recursive and Non-Recursive).
9. Write a program to implement AVL trees.
10. Write a program to implement the graph traversal methods.
11. Write a program to implement the string matching using.
    i) Boyer Moore ii) Brute force

12. Write a program that implements the following Searching methods to sort a given list of integers in ascending order.

i) Bubble Sort ii) Insertion Sort iii)Selection Sort

**TEXT BOOKS:**

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

**REFERENCE BOOK:**

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

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**Chairperson**
**Board of Studies (CSE)**

**R25ES04**

## Basic Electrical Engineering Lab 0 0 2 1

**(Common to CSE, CSE(AI&ML), CSE(Data Science), CSE(Cyber Secuirity) & ECE)**

**Course Objectives:**

1. To measure the electrical parameters for different types of DC theorems approach.
2. To study the transient response of various R, L and C circuits using different excitations.
3. To measure the electrical parameters for different types AC circuits using conventional
4. To determine the performance of different types of DC and AC machines
5. To determine the performance of Transformers.

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

| CO code | Course outcomes | Mapping with POs and PSOs | | | | | DoK |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PSO1 | PSO2 | |
| CO1 | Measure the electrical parameters for different types of DC theorems approach. | 3 | 2 | 2 | 3 | 2 | L1,L2 |
| CO2 | Study the transient response of various R, L and C circuits using different excitations | 3 | 3 | 2 | 2 | 2 | L2,L3 |
| CO3 | Measure the electrical parameters for different types AC circuits using conventional. | 3 | 2 | 2 | 2 | 3 | L3 |
| CO4 | Determine the performance of different types of DC and AC machines | 3 | 2 | 2 | 2 | 3 | L3,L4 |
| CO5 | Determine the performance of Transformers. | 2 | 3 | 2 | 3 | 3 | L2,L4 |

**List of experiments/demonstrations:**

**PART- A (compulsory)**

1. Verification of KVL and KCL. CO's - CO1
2. Verification of Thevenin's and Norton's theorem . CO's - CO1
3. Transient Response of Series RC circuit for DC excitation. CO's - CO2
4. Resonance in series RLC circuit. CO's - CO2
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits. CO's - CO3
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer. CO's - CO5
7. Performance Characteristics of a DC Shunt Motor. CO's - CO4
8. Verification of Superposition theorem. CO's - CO1

**PART-B (any two experiments from the given list)**

1. Torque-Speed Characteristics of a Three-phase Induction Motor. CO's - CO4
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star). CO's - CO5
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation). CO's - CO5

4. Measurement of Active and Reactive Power in a balanced Three-phase circuit. CO's - CO3
5. No-Load Characteristics of a Three-phase Alternator. CO's - CO4

**TEXT BOOKS:**


1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.


**REFERENCE BOOKS:**


1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.


**WEB REFERENCES:**

1. **NPTEL – Basic Electrical Lab (IIT Kharagpur / IIT Madras)**
   Videos and demonstration of experiments on DC theorems, transformers, and machines.
   https://nptel.ac.in/courses/108105053
2. **Virtual Labs – Electrical Engineering (Govt. of India Initiative)**
   Simulated lab experiments for DC, AC, machines, and measurements.
   https://vlab.co.in/broad-area-electrical-engineering
3. **All About Circuits – Lab Experiments**
   Detailed guides and explanations of electrical lab tests and tools.
   https://www.allaboutcircuits.com
4. **Electronics Tutorials – Basic Electrical Concepts**
   Theory support for transformer testing, motors, and circuit behavior.
   https://www.electronics-tutorials.ws
5. **YouTube – Learn Engineering / Gate Smashers**
   Visual tutorials of DC/AC lab experiments, transformer testing, and motor operations.
   https://www.youtube.com/@GateSmasher

**eBooks and Lab Manuals**

6. **"Basic Electrical Engineering Lab Manual" – JNTU / AICTE Format**
   Includes objectives, procedure, formulae, diagrams, viva questions.

https://www.idconline.com/technical_references/pdfs/electrical_engineering/Basic_Electrical_Engineering_Lab_Manual.pdf

7. **"Electrical Machines and Basic Circuits" by Rajendra Prasad** *(Free)*
   Covers transformer and machine experiments in detail.
   https://www.vssut.ac.in/lecture_notes/lecture1428571249.pdf
8. **"Basic Electrical Engineering" by V.K. Mehta & Rohit Mehta** *(Preview)*
   Widely used reference for both theory and labs.
   https://books.google.com/books/about/Basic_Electrical_Engineering.html?id=VcPQAAAAMAAJ

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 15% | 10% |
| L2 | 30% | 20% |
| L3 | 45% | 50% |
| L4 | 10% | 20% |
| L5 | -- | |
| **Total (%)** | **100** | **100** |

## Breakdown of Marks (per 40 marks lab internal)

| Component | Marks |
|---|---|
| Day-to-Day Lab Performance | 15 |
| Record Submission & Maintenance | 10 |
| Viva Voce (Concept + Procedure) | 5 |
| Lab Internal Exam (1 or 2 Tasks) | 10 |
| **Total** | **40** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

## L1 – Remembering

**Short Answer Questions:**

1. Define Ohm's Law.
2. What is the purpose of using a voltmeter in a circuit?
3. Name any two types of losses in a transformer.
4. What is the rated voltage and frequency of domestic AC supply in India?
5. State the purpose of a load test on a DC machine.

## L2 – Understanding

**Short Answer Questions:**

6. Explain how Kirchhoff's Voltage Law (KVL) is applied in a circuit.
7. Describe the significance of resonance in an RLC circuit.
8. What is the function of a commutator in a DC motor?
9. Explain why a no-load test is performed on a transformer.
10. Describe the characteristics of an induction motor based on a torque-speed curve.

**Long Answer Questions:**

1. Describe the procedure to determine the efficiency of a single-phase transformer using the direct loading method.
2. Explain the operation and significance of a three-phase balanced star and delta connection.

## L3 – Applying

**Short Answer Questions:**

11. Apply Thevenin's theorem to simplify a given DC network and calculate load current.
12. Calculate the resonant frequency of a given RLC circuit with known R, L, and C values.
13. Compute the efficiency of a DC shunt motor from observed data.
14. Given voltage and current values, calculate the power factor in an RL circuit.
15. Plot the load characteristics of a DC generator using the observed readings.

**Long Answer Questions:**

3. Perform a load test on a single-phase transformer and determine its regulation and efficiency.
4. Measure and analyze the current and power in a 3-phase balanced load using the two-wattmeter method.

## L4 – Analyzing

**Short Answer Questions:**

16. Analyze the effect of varying resistance in a series circuit on voltage drop and power.
17. Why do readings deviate from theoretical values in transformer tests? Discuss possible sources of error.
18. Compare the efficiency of DC and AC machines based on experimental observations.
19. Interpret the slope and shape of the torque-slip curve in an induction motor.
20. Analyze the deviation in power factor in an RLC circuit when the frequency is varied.

**Long Answer Questions:**

5. Analyze the performance of a DC motor under various loading conditions and explain the observed trend.

6. Evaluate the accuracy of Thevenin's theorem by comparing calculated and observed load currents from the experiment.

**Chairperson**
**Board of Studies (EEE)**

**R25ES10 ENGINEERING WORKSHOP &IT SKILLS LAB 0 0 2 1**

**(Common to EEE, MECH, ECE, CSE, CSE (CS), CSE (AI&ML), CSE (DS))**

**PART-A**

ENGINEERING WORKSHOP

**Course Objectives:**

- To acquire skills in basic engineering practice.
- To identify the hand tools and instruments.
- To acquire measuring skills.
- To acquire practical skills in the trades and understand safety practices.
- To develop the right attitude and learn to work in a team at the workplace.

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

| Course Code | Course Outcomes | Mapping with Pos | | | | | | DoK |
|---|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | PO4 | PO6 | PO9 | |
| CO1 | Identify workshop tools and their operational capabilities. Practice on manufacturing of components using workshop trades including carpentry, fitting, sheet metal | 3 | 2 | 1 | 1 | 1 | 1 | L1,L2 |
| CO2 | Practice on manufacturing of components using workshop trades including foundry and welding. | 3 | 2 | 1 | 1 | 2 | 3 | L1,L2,L3 |
| CO3 | Apply fitting operations in various applications and engineering knowledge for Plumbing, House Wiring Practice, and Making square rod and L-bend from the round rod in black smithy | 3 | 2 | 1 | 1 | 2 | 3 | L2,L3,L5 |

**SYLLABUS**

**1. TRADES FOR EXERCISES**: (Any four trades of the following) **12 HOURS**

I. Carpentry- (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint) **CO's-CO1**

ii. Fitting- (V-Fit, Dovetail Fit & Semi-circular fit) **CO's-CO1**

iii. Tin smithy- (Square Tin, Rectangular Tray & Conical Funnel) **CO's-CO1**

iv. House wiring- (Parallel & Series, Two-way Switch and Tube Light) **CO's-CO3**

v. Foundry- (Preparation of Green Sand Mould using Single Piece and Split Pattern) **CO's-CO2**

**2. TRADES FOR DEMONSTRATION & EXPOSURE**: **6 HOURS**

i. Machine Shop (Lathe operations) **CO's-CO1**

ii. Power Tools **CO's-CO2**

iii. Welding **CO's-CO2**

Board of Studies: Mechanical Engineering

Approved in BoS No: 01 12th August 2025

Approved in ACM No: 01

**TEXT BOOKS:**

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

**REFERENCE BOOKS:**

1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

**WEB REFERENCES:**

1. NPTEL – Basic Engineering Workshop – IIT Kharagpur
2. MIT OCW – Manufacturing Processes
3. Carpentry Tools and Their Uses – The Constructor
4. Sheet Metal Projects – Instructables
5. Electrical House Wiring Basics – EEP
6. Introduction to Foundry – TheConstructor
7. Welding Safety Guide – OSHA

**e- Books:**

1. "Workshop Technology" by Hajra Choudhury, Vol. 1 & 2 Classic text on fitting, carpentry, smithy, welding, and machine tools. Google Books Preview
2. "Basic Mechanical Engineering" by Pravin Kumar Covers basic trades and safety in labs. Google Books
3. "Electrical Wiring Residential" by Ray C. Mullin Excellent for understanding house wiring in detail. Amazon
4. "Fitting and Machining" by TAFE Publications Used in Australian vocational education; practical and rich in diagrams. WorldCat

**Internal Assessment Pattern**

| Cognitive Level | Internal Assessment #1(%) | Internal Assessment #2(%) |
|---|---|---|
| L1 | 10% | 5% |
| L2 | 25% | 20% |
| L3 | 50% | 50% |
| L4 | 10% | 15% |
| L5 | 5% | 10% |
| **Total (%)** | **100** | **100** |

**Sample questions of Various Cognitive Levels**

**L1 – Remembering**

- Name two tools used in carpentry for marking and measuring.
- What is the standard file used in metal fitting?
- List types of sheet metals used in fabrication.
- Define flux in welding.
- What is the purpose of a lathe machine?

**L2 – Understanding**

- Explain the function of a dovetail joint.
- Describe how a parallel wiring connection works.
- Why are safety goggles important in foundry work?
- Differentiate between square fit and V-fit.
- Explain the role of pattern in sand moulding.

**L3 – Applying**

- Fit a square V-joint using file and check accuracy with try square.
- Demonstrate wiring of a two-way switch circuit.
- Create a funnel from a sheet metal piece using required operations.
- Weld two mild steel plates using lap joint method.
- Operate lathe to turn down a mild steel bar to a specific diameter.

**L4 – Analyzing**

- Compare the strength of dovetail and mortise & tenon joints.
- Analyze reasons why a soldering joint might fail.
- Identify errors in sheet metal layout that can waste material.
- Suggest a better weld type for joining thin plates.
- Evaluate advantages of using sand casting over die casting.

**L5 – Creating / Evaluating**

- Design an alternate carpentry joint that combines both strength and ease of making.

- Suggest modifications to improve ergonomics in the fitting workstation.
- Propose a new layout for the electrical wiring panel to improve accessibility.
- Design a jig/fixture to hold work piece during welding to improve safety and accuracy.
- Critically evaluate traditional hand tools vs. modern power tools for workshop tasks.

Chairperson
Board of Studies (ME)

**R25ES10 ENGINEERING WORKSHOP &IT SKILLS LAB 0 0 2 1**

**(Common to all branches)**

**PART-B**

IT SKILLS LAB

**Course Objectives:**

1. To assemble and disassemble a computer.
2. To solve hardware and software problems.
3. To learn about Networking of computers and use Internet facility for Browsing and Searching.
4. To develop project documentation using MS word.
5. To work with various productivity tools including Excel, PowerPoint.
6. To work with different online repositories such as GITHUB, AI CHATBOT.

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

| Course Code | Course Outcomes | Mapping with POs and PSOs | | | | | Dok |
|---|---|---|---|---|---|---|---|
| | | PO1 | PO2 | PO3 | S0 1 | S0 2 | |
| CO1 | Perform Hardware troubleshooting and Perform Hardware troubleshooting | 3 | 3 | 3 | 3 | 2 | L2, L3 |
| CO2 | Apply different way of hooking the PC on to the internet from home and Workplace. | 3 | 2 | 2 | 2 | 3 | L1, L2 L3 |
| CO3 | Design word documents by learning word processing and Create presentations by using different styles and using AI Tools-Chat GPT and GITHUB | 3 | 3 | 3 | 2 | 3 | 2, L3, L4 |

**SYLLABUS**

**PC Hardware & Software Installation: 9 Hours**

**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 it 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.

**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. Lab instructor should verify the installation and follow it up with a Viva. **COs-CO1**

**Internet &World Wide Web: 6 Hours**

**Task1:** 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

**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. **COs-CO2**

**MS WORD 6 Hours**

**Task 1:** 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 2:** 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: 6 Hours**

**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, and 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

**POWER POINT 6 Hours**

**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.**COs-CO3**

**AI TOOLS – Chat GPT 6 Hours**

**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."

**Explore – GITHUB** **6 Hours**

**Task 1:** Students should understand GITHUB and should possess accounts in it.
**Task 2:** Students should explore different repositories available in GITHUB and student should Create his/ her own simple repositories.
**Task 3:** Students should take simple experiments /presentations and upload them in their GITHUB Account.
**Task 4:** Students should understand how GITHUB Enterprise Cloud is used and also explore the GIT and GIT HUB resources. **COs-CO3**

**Reference Books:**

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
3. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
4. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCOPress, Pearson Education, 3rd edition
5. "Excel 2021: A Comprehensive Guide"by Chris Benham.
6. "Microsoft PowerPoint 2021: A Beginner's Guide" by Steve Lambert
7. GITHUB Quick Start Tutorials

**WEB REFERENCES:**

1. https://en.wikipedia.org/wiki/Main_Page
2. https://edu.gcfglobal.org/en/office2007
3. https://www.w3schools.com

**Internal Assessment Pattern:**

| Cognitive Level | Internal Assessment #1(%) |
|---|---|
| L1 | 30 |
| L2 | 20 |
| L3 | 30 |
| L4 | 20 |
| **Total (%)** | **100** |

**Sample Short and Long Answers questions of Various Cognitive Levels**

**L1: Remember**

1. Identify Peripherals of a computer
2. Draw a Block Diagram of the CPU and explain the components along with the functions.
3. Explain the various steps in assembling and dissembling of the CPU.
4. Write the basic utilities used while creating a PowerPoint presentation.

**L2: Understand**

1. How to install windows operating system.
2. What are search engines and brief the advantages of search engines.
3. Explain the process of creating a project abstract.
4. Explain how to explore GITHUB resources

**L3: Apply**

1. Explain the process orientation and connectivity boot camp
2. Write the different formulae used while calculating GPA
3. Explain the insertion of various templates while creating power point presentations.
4. Discuss the format for customization your browser for effective searching and online etiquette.

**L4: Analysing**

1. Analyze a structured approach to experiment with prompts.
2. Explore different repositories available in GITHUB.
3. "Imagine a world where every person is born with a unique, magical ability that reflects their deepest desire or fear. Describe a day in the life of a character who discovers that their ability is far more powerful and dangerous than they ever imagined. How does this revelation affect their relationships, their view of themselves, and their place in society?"

**Chairperson**
**Board of Studies (CSE)**

**R25MC01** **EMPLOYABILITY SKILLS** **0 0 2 1**

(Common to all Branches)

**Learning Outcomes:**

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

1. Listen actively and identify important in formation in spoken texts
2. Interpret the speech and infer the intention of the speaker
3. Improve their accent for intelligibility.
4. Speak fluently with clarity and confidence
5. Use the language in real life situations

## SYLLABUS

**Unit – I: Introduction To communication skills** **12 Hours**

1. Significance &Functions of communication skills
2. Warm up session
3. Routine
4. Parts of Speech
5. Sentence construction
6. LSRW SKILLS
7. Productive skills
8. Receptive skills
9. subject- Verb Agreement

**UNIT-II Emotional Intelligence &Adaptability** **10 Hours**

1. Role Playing
2. Building Better Habits Through Emotional Discipline
3. Getting someone's Attention and Interrupting
4. Giving Attention & Seeking Clarification
5. Asking for Giving opinions
6. Agreeing & Disagreeing with opinions
7. Building Self -confidence through Self Reflection
8. Exploring Your Values & Beliefs
9. Helping Old People & Guiding Young People
10. Practicing Patience
11. Practicing Gratitude
12. Finding Purpose in Daily Activities
13. Building Resilience After Setbacks
14. Practicing Conflict Resolution Basics
15. Learning to Apologize Sincerely
16. Practicing Team Work In Daily Life
17. Building Rapport
18. Saying 'No' Without Guilt
19. Practicing Empathy & Sympathy
20. Creativity
21. Motivation
22. Time Management
23. Anger Management
24. Self Improvement
25. Decision- Making
26. Holistic Health&Ethical Behaviour

**Unit-III: Brainstorming** **10 Hours**

1. Adjectives
2. Root Words
3. Prefixes and Suffixes
4. Homonyms , Homographs & Homophones
5. Basic to Advanced Vocabulary
6. Describing Person/place/things/objects

**Unit – IV: Non-Verbal Communication** **10 Hours**

1. Personal Appearance
2. Posture
3. Gestures
4. Facial Expressions
5. Eye Contact
6. Space Distancing
7. Group Activities & Group Dynamics
8. Interpersonal skills
9. Skits
10. Debate
11. Important Quotes & Saying

**Unit – V: DYADIC COMMUNICATION** **10 Hours**

1. Face to Face Conversation
2. Telephonic Conversation
3. Interviews

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Approved in BOS No: 01
Approved in ACM No: 01

**Suggested Readings:**

**1. Soft Skills: Know Yourself and Know the World** – K. Alex Publisher: S. Chand Publishing
**2. Developing Employability Skills** – M. S. Rao Publisher: Pearson Education
**3. Enhancing Employability Skills** – Shalini Verma publisher: Pearson Education
**4. Employability Skills** – S. P. Dhanave Publisher: Orient BlackSwan
**5. Soft Skills and Employability Skills** – T. M. Farhathullah Publisher: Emerald Publishers
**6. Business Communication** – Meenakshi Raman & Prakash Singh Publisher: Oxford University Press
**7. Communication Skills for Professionals** – Nira Konar Publisher: PHI Learning

**Sample Short and Long Answers questions of Various Cognitive Levels**

**L1: Remember**

1. What are the key differences between effective and poor listening?
2. How does the listening skill impacts learning?
3. What are the different types of listening skills?
4. What are the key points of barriers of listening?
5. What are the advantages and disadvantages reading skill?
6. How does communication platforms help the students?

**L2: Understanding**

1. Discuss the various strategies used in communication?
2. How does language play a role in the growth and development of student career?
3. What is role play, and how does it support in language learning?
4. Discuss the role of conversation and its impact on language learning.
5. How do the debates support students?

**L3: Applying**

1. What are the different types Communication?
2. What are the skills required in Practicing Team Work In Daily Life
3. Perform a descriptive speech about a place using a provided picture.
4. Whatis JAM activity and how is it influencing the language learners?

**L4: Analysing**

1. How do Public speech influence your learning?
2. What are the key challenges faced in giving a presentation ?
3. How does Presentation skills develop your oral skills?
4. Discuss the role of Group discussion and its advantages?
5. How can Language helps in corporate world?

**L5: Evaluating**

1. What is inter- personal communication?
2. How do blog platforms impact writing style?
3. Explain the concept of Group activities and Group Dynamics?
4. How does building rapport play a role in delivering speech?
5. What is Telephone etiquette?

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**Chairperson**

**(Board of English)**