

**DEPARTMENT OF HUMANITIES AND SCIENCES**  
**ACADEMIC YEAR (2025-26)**

**COMPUTER SCIENCE & ENGINEERING**

**YEAR: I**

**SEMISTER: I**

**REGULATION: R25**

**Course Name: Matrices and Calculus**

**Course Code: 25MA101BS**

|     |   |
|-----|---|
| CO1 | Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations |
| CO2 | Find the Eigen values and Eigen vectors   |
| CO3 | Reduce the quadratic form to canonical form using orthogonal transformations.                                       |
| CO4 | Solve the applications on the mean value theorems.  |
| CO5 | Find the extreme values of functions of two variables with/ without constraints.                                    |
| CO6 | Evaluate the multiple integrals and apply the concept to find areas, volumes  |

**Course Name: Engineering Chemistry**

**Course Code: 25CH102BS**

|     |  |
|-----|--|
| CO1 | Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.   |
| CO2 | Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.  |
| CO3 | Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs. |
| CO4 | Students will learn the basic concepts and properties of polymers and other engineering materials.   |
| CO5 | Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.     |

**Course Name: Programming for Problem Solving**

**Course Code: 25CS105ES**

|     |   |
|-----|---|
| CO1 | To write algorithms and to draw flowcharts for solving problems.            |
| CO2 | To convert the algorithms/flowcharts to C programs.                         |
| CO3 | To code and test a given logic in the C programming language.               |
| CO4 | To decompose a problem into functions and to develop modular reusable code. |
| CO5 | To use arrays, pointers, strings and structures to write C programs.        |
| CO6 | Searching and sorting problems.   |

**Course Name: English for Skill Enhancement**

**Course Code: 25EN103HS**

|     |   |
|-----|---|
| CO1 | Choose appropriate vocabulary in their oral and written communication.                      |
| CO2 | Demonstrate their understanding of the rules of functional grammar and sentence structures. |
| CO3 | Develop comprehension skills from known and unknown passages.                               |
| CO4 | Write paragraphs, essays, précis and draft letters.   |
| CO5 | Write abstracts and reports in various contexts.  |

**Course Name: Electronic Devices & Circuits****Course Code: 25EC104ES**

|     |   |
|-----|---|
| CO1 | Analyze the operation and V-I characteristics of semiconductor diodes.  |
| CO2 | Apply the diodes in rectifiers, clippers and clamping circuits.   |
| CO3 | Evaluate the operation and configuration of Bipolar Junction Transistors (BJTs) and design appropriate biasing networks for BJTs                              |
| CO4 | Analyse the operation and configuration of FETs.  |
| CO5 | Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies. |

**Course Name: Engineering Chemistry Lab****Course Code: 25CH106BS**

|     |   |
|-----|---|
| CO1 | Students will develop practical skills through hands-on chemistry experiments relevant to engineering.  |
| CO2 | Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.                         |
| CO3 | Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions. |
| CO4 | Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.  |
| CO5 | Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).                         |

**Course Name: Programming for Problem Solving Lab****Course Code: 25CS107ES**

|     |  |
|-----|--|
| CO1 | Demonstrate understanding and application of fundamental C programming constructs. |
| CO2 | Develop, trace, and analyze C programs using control structures.                   |
| CO3 | Decompose complex problems into modular solutions using functions.                 |
| CO4 | Implement string manipulation and file handling techniques.                        |
| CO5 | Apply and evaluate searching and sorting algorithms.                               |

**Course Name: English Language and Communication Skills Lab****Course Code: 25EN108HS**

|     |  |
|-----|--|
| CO1 | Listen actively and identify important information in spoken texts |
| CO2 | Interpret the speech and infer the intention of the speaker        |
| CO3 | Improve their accent for intelligibility                           |
| CO4 | Speak fluently with clarity and confidence                         |

**Course Name: Engineering Workshop****Course Code: 25ME109ES**

|     |  |
|-----|--|
| CO1 | Understand the basic manufacturing processes and operations.                             |
| CO2 | Use hand tools and equipment safely and efficiently.                                     |
| CO3 | Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining |
| CO4 | Read and interpret workshop drawings   |
| CO5 | Develop teamwork, time management, and quality awareness in a workshop environment       |

**YEAR: I**

**SEMISTER: II**

**REGULATION: R25**

**Course Name: Ordinary Differential Equations and Vector Calculus**

**Course Code: 25MA201BS**

|     |   |
|-----|---|
| CO1 | Identify whether the given differential equation of first order is exact or not                           |
| CO2 | Solve higher differential equation and apply the concept of differential equation to real world problems. |
| CO3 | Use the Laplace transforms techniques for solving ODE's.  |
| CO4 | Evaluate the line, surface and volume integrals and converting them from one to another                   |

**Course Name: Advanced Engineering Physics**

**Course Code: 25PH202BS**

|     |   |
|-----|---|
| CO1 | Analyze crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.   |
| CO2 | Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.           |
| CO3 | Classify dielectric and magnetic materials and explain their properties, synthesis, and applications.           |
| CO4 | Explain the principles of lasers and fibre optics and their applications in communication and sensing.          |
| CO5 | Understand quantum computing concepts, Classical bits and qubits, Single and multiple qubits and quantum gates. |

**Course Name: Engineering Drawing and Computer Aided Drafting**

**Course Code: 25ME203ES**

|     |   |
|-----|---|
| CO1 | Understand and apply the principles of orthographic and isometric projections.      |
| CO2 | Create sectional views and dimensioned drawings using BIS standards.                |
| CO3 | Use CAD software to generate 2D engineering drawings.                               |
| CO4 | Visualize and construct solid models from 2D views.                                 |
| CO5 | Interpret and produce engineering drawings of mechanical components and assemblies. |
| CO6 | Demonstrate drafting skills for practical and industrial applications.              |

**Course Name: Basic Electrical Engineering**

**Course Code: 25EE204ES**

|     |   |
|-----|---|
| CO1 | Understand and analyze basic DC Electrical circuits.          |
| CO2 | Formulate and predict the basic AC circuits.                  |
| CO3 | Study the working principle of Transformers.                  |
| CO4 | Analyze the working of Electrical Machines.                   |
| CO5 | Introduce components of Low Voltage Electrical Installations. |

**Course Name: Data Structures****Course Code: 25CS205ES**

|     |  |
|-----|--|
| CO1 | Understand and implement basic linear data structures like linked lists, stacks and queues.                                      |
| CO2 | Construct and manipulate various trees, including binary search and balanced trees, applying traversal and balancing techniques. |
| CO3 | Analyse and implement multi-way search trees and heaps, applying efficient search algorithms.                                    |
| CO4 | Represent graphs, perform graph traversals, and apply advanced sorting algorithms.   |
| CO5 | Implement hashing techniques, handle collisions, and understand file organization and indexing methods.                          |

**Course Name: Advanced Engineering Physics Lab****Course Code: 25PH206BS**

|     |  |
|-----|--|
| CO1 | Demonstrate working knowledge of laser systems and determine their characteristics.                          |
| CO2 | Demonstrate working knowledge of optical fiber parameters through experimental study.                        |
| CO3 | Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials. |
| CO4 | Characterize semiconductors using Hall effect and energy gap measurement techniques.                         |
| CO5 | Apply scientific methods for accurate data collection, analysis, and technical report writing.               |

**Course Name: Data Structures Lab****Course Code: 25CS207ES**

|     |   |
|-----|---|
| CO1 | Implement and manipulate various types of linked lists with fundamental operations.   |
| CO2 | Design and develop stack and queue data structures using arrays and abstract data types.  |
| CO3 | Apply and implement different sorting algorithms to organize data in ascending order.   |
| CO4 | Construct and traverse complex tree data structures including Binary Search Trees, B-Trees, B+ Trees, AVI Trees, and Red-Black Trees. |
| CO5 | Implement graph traversal algorithms and various hashing functions for efficient data searching and storage.                          |

**Course Name: IT Workshop****Course Code: 25CS208ES**

|     |   |
|-----|---|
| CO1 | Perform Hardware troubleshooting                      |
| CO2 | Understand Hardware components and inter dependencies |
| CO3 | Safeguard computer systems from viruses/worms         |
| CO4 | Document/ Presentation preparation                    |
| CO5 | Perform calculations using spreadsheets               |

**Course Name: Basic Electrical Engineering Lab****Course Code: 25EE209ES**

|     |  |
|-----|--|
| CO1 | Verify the basic DC Electrical circuits through different experiments.                                     |
| CO2 | Analyze the transient responses of R, L and C circuits for different input conditions.                     |
| CO3 | Evaluate the performance calculations of Transformer through suitable testing methods.                     |
| CO4 | Acknowledge the principles of operation and the main features of electric machines and their applications. |
| CO5 | Acquire skills in using electrical measuring devices.  |

|     |   |
|-----|---|
| CO1 | Apply fundamental Python programming concepts to solve basic problems.  |
| CO2 | Implement and manipulate Python data structures including list, tuples, dictionaries, strings, and matrices for data processing.            |
| CO3 | Demonstrate file handling operations, module creation, and exception handling for building robust Python applications.                      |
| CO4 | Utilize Object-Oriented Programming principles in Python to design and implement custom classes and graphical representations using canvas. |
| CO5 | Integrate external Python libraries like NumPy, SciePy, and Tkinter for numerical computing, data visualization, and GUI development.       |

## CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

**YEAR: I**

**SEMISTER: I**

**REGULATION: R25**

**Course Name: Matrices and Calculus**

**Course Code: 25MA101BS**

|     |   |
|-----|---|
| CO1 | Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations |
| CO2 | Find the Eigen values and Eigen vectors   |
| CO3 | Reduce the quadratic form to canonical form using orthogonal transformations.                                       |
| CO4 | Solve the applications on the mean value theorems.  |
| CO5 | Find the extreme values of functions of two variables with/ without constraints.                                    |
| CO6 | Evaluate the multiple integrals and apply the concept to find areas, volumes  |

**Course Name: Advanced Engineering Physics**

**Course Code: 25PH102BS**

|     |   |
|-----|---|
| CO1 | Analyze crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.   |
| CO2 | Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.           |
| CO3 | Classify dielectric and magnetic materials and explain their properties, synthesis, and applications.           |
| CO4 | Explain the principles of lasers and fibre optics and their applications in communication and sensing.          |
| CO5 | Understand quantum computing concepts, Classical bits and qubits, Single and multiple qubits and quantum gates. |

**Course Name: Programming for Problem Solving**

**Course Code: 25CS105ES**

|     |   |
|-----|---|
| CO1 | To write algorithms and to draw flowcharts for solving problems.            |
| CO2 | To convert the algorithms/flowcharts to C programs.                         |
| CO3 | To code and test a given logic in the C programming language.               |
| CO4 | To decompose a problem into functions and to develop modular reusable code. |
| CO5 | To use arrays, pointers, strings and structures to write C programs.        |
| CO6 | Searching and sorting problems.   |

**Course Name: Engineering Drawing and Computer Aided Drafting**

**Course Code: 25ME103ES**

|     |   |
|-----|---|
| CO1 | Understand and apply the principles of orthographic and isometric projections.      |
| CO2 | Create sectional views and dimensioned drawings using BIS standards.                |
| CO3 | Use CAD software to generate 2D engineering drawings.                               |
| CO4 | Visualize and construct solid models from 2D views.                                 |
| CO5 | Interpret and produce engineering drawings of mechanical components and assemblies. |
| CO6 | Demonstrate drafting skills for practical and industrial applications.              |

**Course Name: Basic Electrical Engineering****Course Code: 25EE104ES**

|     |   |
|-----|---|
| CO1 | Understand and analyze basic DC Electrical circuits.          |
| CO2 | Formulate and predict the basic AC circuits.                  |
| CO3 | Study the working principle of Transformers.                  |
| CO4 | Analyze the working of Electrical Machines.                   |
| CO5 | Introduce components of Low Voltage Electrical Installations. |

**Course Name: Advanced Engineering Physics Lab****Course Code: 25PH106BS**

|     |  |
|-----|--|
| CO1 | Demonstrate working knowledge of laser systems and determine their characteristics.                          |
| CO2 | Demonstrate working knowledge of optical fiber parameters through experimental study.                        |
| CO3 | Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials. |
| CO4 | Characterize semiconductors using Hall effect and energy gap measurement techniques.                         |
| CO5 | Apply scientific methods for accurate data collection, analysis, and technical report writing.               |

**Course Name: Programming for Problem Solving Lab****Course Code: 25CS107ES**

|     |  |
|-----|--|
| CO1 | Demonstrate understanding and application of fundamental C programming constructs. |
| CO2 | Develop, trace, and analyze C programs using control structures.                   |
| CO3 | Decompose complex problems into modular solutions using functions.                 |
| CO4 | Implement string manipulation and file handling techniques.                        |
| CO5 | Apply and evaluate searching and sorting algorithms.                               |

**Course Name: Basic Electrical Engineering Lab****Course Code: 25EE109ES**

|     |  |
|-----|--|
| CO1 | Verify the basic DC Electrical circuits through different experiments.                                     |
| CO2 | Analyze the transient responses of R, L and C circuits for different input conditions.                     |
| CO3 | Evaluate the performance calculations of Transformer through suitable testing methods.                     |
| CO4 | Acknowledge the principles of operation and the main features of electric machines and their applications. |
| CO5 | Acquire skills in using electrical measuring devices.  |

**Course Name: IT Workshop****Course Code: 25CS108ES**

|     |   |
|-----|---|
| CO1 | Perform Hardware troubleshooting                      |
| CO2 | Understand Hardware components and inter dependencies |
| CO3 | Safeguard computer systems from viruses/worms         |
| CO4 | Document/ Presentation preparation                    |
| CO5 | Perform calculations using spreadsheets               |

**YEAR: I**

**SEMISTER: II**

**REGULATION: R25**

**Course Name: Ordinary Differential Equations and Vector Calculus      Course Code: 25MA201BS**

|     |   |
|-----|---|
| CO1 | Identify whether the given differential equation of first order is exact or not                           |
| CO2 | Solve higher differential equation and apply the concept of differential equation to real world problems. |
| CO3 | Use the Laplace transforms techniques for solving ODE's.  |
| CO4 | Evaluate the line, surface and volume integrals and converting them from one to another                   |

**Course Name: Engineering Chemistry      Course Code: 25CH202BS**

|     |  |
|-----|--|
| CO1 | Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.   |
| CO2 | Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.  |
| CO3 | Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs. |
| CO4 | Students will learn the basic concepts and properties of polymers and other engineering materials.   |
| CO5 | Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.     |

**Course Name: Electronic Devices and Circuits      Course Code: 25EC204ES**

|     |   |
|-----|---|
| CO1 | Analyze the operation and V-I characteristics of semiconductor diodes.  |
| CO2 | Apply the diodes in rectifiers, clippers and clamping circuits.   |
| CO3 | Evaluate the operation and configuration of Bipolar Junction Transistors (BJTs) and design appropriate biasing networks for BJTs                              |
| CO4 | Analyse the operation and configuration of FETs.  |
| CO5 | Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies. |

**Course Name: Data Structures      Course Code: 25CS205ES**

|     |  |
|-----|--|
| CO1 | Understand and implement basic linear data structures like linked lists, stacks and queues.                                      |
| CO2 | Construct and manipulate various trees, including binary search and balanced trees, applying traversal and balancing techniques. |
| CO3 | Analyse and implement multi-way search trees and heaps, applying efficient search algorithms.                                    |
| CO4 | Represent graphs, perform graph traversals, and apply advanced sorting algorithms.   |
| CO5 | Implement hashing techniques, handle collisions, and understand file organization and indexing methods.                          |

**Course Name: English for Skill Enhancement****Course Code: 25EN203HS**

|     |   |
|-----|---|
| CO1 | Choose appropriate vocabulary in their oral and written communication.                      |
| CO2 | Demonstrate their understanding of the rules of functional grammar and sentence structures. |
| CO3 | Develop comprehension skills from known and unknown passages.                               |
| CO4 | Write paragraphs, essays, précis and draft letters.   |
| CO5 | Write abstracts and reports in various contexts.  |

**Course Name: Engineering Chemistry Lab****Course Code: 25CH206BS**

|     |   |
|-----|---|
| CO1 | Students will develop practical skills through hands-on chemistry experiments relevant to engineering.  |
| CO2 | Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.                         |
| CO3 | Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions. |
| CO4 | Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.  |
| CO5 | Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).                         |

**Course Name: Data Structures Lab****Course Code: 25CS207ES**

|     |   |
|-----|---|
| CO1 | Implement and manipulate various types of linked lists with fundamental operations.   |
| CO2 | Design and develop stack and queue data structures using arrays and abstract data types.  |
| CO3 | Apply and implement different sorting algorithms to organize data in ascending order.   |
| CO4 | Construct and traverse complex tree data structures including Binary Search Trees, B-Trees, B+ Trees, AVI Trees, and Red-Black Trees. |
| CO5 | Implement graph traversal algorithms and various hashing functions for efficient data searching and storage.                          |

**Course Name: English Language and Communication Skills Lab****Course Code: 25EN208HS**

|     |  |
|-----|--|
| CO1 | Listen actively and identify important information in spoken texts |
| CO2 | Interpret the speech and infer the intention of the speaker        |
| CO3 | Improve their accent for intelligibility                           |
| CO4 | Speak fluently with clarity and confidence                         |

**Course Name: Engineering Workshop****Course Code: 25ME209ES**

|     |  |
|-----|--|
| CO1 | Understand the basic manufacturing processes and operations.                             |
| CO2 | Use hand tools and equipment safely and efficiently.                                     |
| CO3 | Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining |
| CO4 | Read and interpret workshop drawings   |
| CO5 | Develop teamwork, time management, and quality awareness in a workshop environment       |

**Course Name: Python Programming Lab**

**Course Code: 25CS210ES**

|     |   |
|-----|---|
| CO1 | Apply fundamental Python programming concepts to solve basic problems.  |
| CO2 | Implement and manipulate Python data structures including list, tuples, dictionaries, strings, and matrices for data processing.            |
| CO3 | Demonstrate file handling operations, module creation, and exception handling for building robust Python applications.                      |
| CO4 | Utilize Object-Oriented Programming principles in Python to design and implement custom classes and graphical representations using canvas. |
| CO5 | Integrate external Python libraries like NumPy, SciePy, and Tkinter for numerical computing, data visualization, and GUI development.       |

**CSE (DATA SCIENCE)****YEAR: I****SEMISTER: I****REGULATION: R25****Course Name: Matrices and Calculus****Course Code: 25MA101BS**

|     |   |
|-----|---|
| CO1 | Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations |
| CO2 | Find the Eigen values and Eigen vectors   |
| CO3 | Reduce the quadratic form to canonical form using orthogonal transformations.                                       |
| CO4 | Solve the applications on the mean value theorems.  |
| CO5 | Find the extreme values of functions of two variables with/ without constraints.                                    |
| CO6 | Evaluate the multiple integrals and apply the concept to find areas, volumes  |

**Course Name: Engineering Chemistry****Course Code: 25CH102BS**

|     |  |
|-----|--|
| CO1 | Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.   |
| CO2 | Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.  |
| CO3 | Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs. |
| CO4 | Students will learn the basic concepts and properties of polymers and other engineering materials.   |
| CO5 | Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.     |

**Course Name: Programming for Problem Solving****Course Code: 25CS105ES**

|     |   |
|-----|---|
| CO1 | To write algorithms and to draw flowcharts for solving problems.            |
| CO2 | To convert the algorithms/flowcharts to C programs.                         |
| CO3 | To code and test a given logic in the C programming language.               |
| CO4 | To decompose a problem into functions and to develop modular reusable code. |
| CO5 | To use arrays, pointers, strings and structures to write C programs.        |
| CO6 | Searching and sorting problems.   |

**Course Name: Basic Electrical Engineering****Course Code: 25EE104ES**

|     |   |
|-----|---|
| CO1 | Understand and analyze basic DC Electrical circuits.          |
| CO2 | Formulate and predict the basic AC circuits.                  |
| CO3 | Study the working principle of Transformers.                  |
| CO4 | Analyze the working of Electrical Machines.                   |
| CO5 | Introduce components of Low Voltage Electrical Installations. |

**Course Name: Electronic Devices & Circuits****Course Code: 25EC104ES**

|     |   |
|-----|---|
| CO1 | Analyze the operation and V-I characteristics of semiconductor diodes.  |
| CO2 | Apply the diodes in rectifiers, clippers and clamping circuits.   |
| CO3 | Evaluate the operation and configuration of Bipolar Junction Transistors (BJTs) and design appropriate biasing networks for BJTs                              |
| CO4 | Analyse the operation and configuration of FETs.  |
| CO5 | Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies. |

**Course Name: Engineering Chemistry Lab****Course Code: 25CH106BS**

|     |   |
|-----|---|
| CO1 | Students will develop practical skills through hands-on chemistry experiments relevant to engineering.  |
| CO2 | Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.                         |
| CO3 | Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions. |
| CO4 | Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.  |
| CO5 | Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).                         |

**Course Name: Programming for Problem Solving Lab****Course Code: 25CS107ES**

|     |  |
|-----|--|
| CO1 | Demonstrate understanding and application of fundamental C programming constructs. |
| CO2 | Develop, trace, and analyze C programs using control structures.                   |
| CO3 | Decompose complex problems into modular solutions using functions.                 |
| CO4 | Implement string manipulation and file handling techniques.                        |
| CO5 | Apply and evaluate searching and sorting algorithms.                               |

**Course Name: Basic Electrical Engineering Lab****Course Code: 25EE109ES**

|     |  |
|-----|--|
| CO1 | Verify the basic DC Electrical circuits through different experiments.                                     |
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| CO4 | Acknowledge the principles of operation and the main features of electric machines and their applications. |
| CO5 | Acquire skills in using electrical measuring devices.  |

**Course Name: Engineering Workshop****Course Code: 25ME109ES**

|     |  |
|-----|--|
| CO1 | Understand the basic manufacturing processes and operations.                             |
| CO2 | Use hand tools and equipment safely and efficiently.                                     |
| CO3 | Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining |
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**YEAR: I**

**SEMISTER: II**

**REGULATION: R25**

**Course Name: Ordinary Differential Equations and Vector Calculus**

**Course Code: 25MA201BS**

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|-----|---|
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**Course Code: 25PH202BS**

|     |   |
|-----|---|
| CO1 | Analyze crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.   |
| CO2 | Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.           |
| CO3 | Classify dielectric and magnetic materials and explain their properties, synthesis, and applications.           |
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| CO5 | Understand quantum computing concepts, Classical bits and qubits, Single and multiple qubits and quantum gates. |

**Course Name: Engineering Drawing and Computer Aided Drafting**

**Course Code: 25ME203ES**

|     |   |
|-----|---|
| CO1 | Understand and apply the principles of orthographic and isometric projections.      |
| CO2 | Create sectional views and dimensioned drawings using BIS standards.                |
| CO3 | Use CAD software to generate 2D engineering drawings.                               |
| CO4 | Visualize and construct solid models from 2D views.                                 |
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**Course Name: English for Skill Enhancement**

**Course Code: 25EN203HS**

|     |   |
|-----|---|
| CO1 | Choose appropriate vocabulary in their oral and written communication.                      |
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**Course Name: Data Structures****Course Code: 25CS205ES**

|     |  |
|-----|--|
| CO1 | Understand and implement basic linear data structures like linked lists, stacks and queues.                                      |
| CO2 | Construct and manipulate various trees, including binary search and balanced trees, applying traversal and balancing techniques. |
| CO3 | Analyse and implement multi-way search trees and heaps, applying efficient search algorithms.                                    |
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|     |  |
|-----|--|
| CO1 | Demonstrate working knowledge of laser systems and determine their characteristics.                          |
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| CO3 | Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials. |
| CO4 | Characterize semiconductors using Hall effect and energy gap measurement techniques.                         |
| CO5 | Apply scientific methods for accurate data collection, analysis, and technical report writing.               |

**Course Name: Data Structures Lab****Course Code: 25CS207ES**

|     |   |
|-----|---|
| CO1 | Implement and manipulate various types of linked lists with fundamental operations.   |
| CO2 | Design and develop stack and queue data structures using arrays and abstract data types.  |
| CO3 | Apply and implement different sorting algorithms to organize data in ascending order.   |
| CO4 | Construct and traverse complex tree data structures including Binary Search Trees, B-Trees, B+ Trees, AVL Trees, and Red-Black Trees. |
| CO5 | Implement graph traversal algorithms and various hashing functions for efficient data searching and storage.                          |

**Course Name: IT Workshop****Course Code: 25CS208ES**

|     |   |
|-----|---|
| CO1 | Perform Hardware troubleshooting                      |
| CO2 | Understand Hardware components and inter dependencies |
| CO3 | Safeguard computer systems from viruses/worms         |
| CO4 | Document/ Presentation preparation                    |
| CO5 | Perform calculations using spreadsheets               |

**Course Name: English Language and Communication Skills Lab****Course Code: 25EN208HS**

|     |  |
|-----|--|
| CO1 | Listen actively and identify important information in spoken texts |
| CO2 | Interpret the speech and infer the intention of the speaker        |
| CO3 | Improve their accent for intelligibility                           |
| CO4 | Speak fluently with clarity and confidence                         |

**Course Name: Python Programming Lab**

**Course Code: 25CS210ES**

|     |   |
|-----|---|
| CO1 | Apply fundamental Python programming concepts to solve basic problems.  |
| CO2 | Implement and manipulate Python data structures including list, tuples, dictionaries, strings, and matrices for data processing.            |
| CO3 | Demonstrate file handling operations, module creation, and exception handling for building robust Python applications.                      |
| CO4 | Utilize Object-Oriented Programming principles in Python to design and implement custom classes and graphical representations using canvas. |
| CO5 | Integrate external Python libraries like NumPy, SciePy, and Tkinter for numerical computing, data visualization, and GUI development.       |

# Electronics and Communication Engineering

**YEAR: I**

**SEMISTER: I**

**REGULATION: R25**

**Course Name: Matrices and Calculus**

**Course Code: 25MA101BS**

|     |   |
|-----|---|
| CO1 | Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations |
| CO2 | Find the Eigen values and Eigen vectors   |
| CO3 | Reduce the quadratic form to canonical form using orthogonal transformations.                                       |
| CO4 | Solve the applications on the mean value theorems.  |
| CO5 | Find the extreme values of functions of two variables with/ without constraints.                                    |
| CO6 | Evaluate the multiple integrals and apply the concept to find areas, volumes  |

**Course Name: Advanced Engineering Physics**

**Course Code: 25PH102BS**

|     |   |
|-----|---|
| CO1 | Analyze crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.   |
| CO2 | Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.           |
| CO3 | Classify dielectric and magnetic materials and explain their properties, synthesis, and applications.           |
| CO4 | Explain the principles of lasers and fibre optics and their applications in communication and sensing.          |
| CO5 | Understand quantum computing concepts, Classical bits and qubits, Single and multiple qubits and quantum gates. |

**Course Name: Programming for Problem Solving**

**Course Code: 25CS105ES**

|     |   |
|-----|---|
| CO1 | To write algorithms and to draw flowcharts for solving problems.            |
| CO2 | To convert the algorithms/flowcharts to C programs.                         |
| CO3 | To code and test a given logic in the C programming language.               |
| CO4 | To decompose a problem into functions and to develop modular reusable code. |
| CO5 | To use arrays, pointers, strings and structures to write C programs.        |
| CO6 | Searching and sorting problems.   |

**Course Name: Engineering Drawing and Computer Aided Drafting**

**Course Code: 25ME103ES**

|     |   |
|-----|---|
| CO1 | Understand and apply the principles of orthographic and isometric projections.      |
| CO2 | Create sectional views and dimensioned drawings using BIS standards.                |
| CO3 | Use CAD software to generate 2D engineering drawings.                               |
| CO4 | Visualize and construct solid models from 2D views.                                 |
| CO5 | Interpret and produce engineering drawings of mechanical components and assemblies. |
| CO6 | Demonstrate drafting skills for practical and industrial applications.              |

**Course Name: Introduction to Electrical Engineering****Course Code: 25EC104ES**

|     |   |
|-----|---|
| CO1 | Understand and analyze basic DC Electrical circuits.          |
| CO2 | Formulate and predict the basic AC circuits.                  |
| CO3 | Study the working principle of Transformers.                  |
| CO4 | Analyze the working of Electrical Machines.                   |
| CO5 | Introduce components of Low Voltage Electrical Installations. |

**Course Name: English for Skill Enhancement****Course Code: 25EN103HS**

|     |   |
|-----|---|
| CO1 | Choose appropriate vocabulary in their oral and written communication.                      |
| CO2 | Demonstrate their understanding of the rules of functional grammar and sentence structures. |
| CO3 | Develop comprehension skills from known and unknown passages.                               |
| CO4 | Write paragraphs, essays, précis and draft letters.   |
| CO5 | Write abstracts and reports in various contexts.  |

**Course Name: Advanced Engineering Physics Lab****Course Code: 25PH106BS**

|     |  |
|-----|--|
| CO1 | Demonstrate working knowledge of laser systems and determine their characteristics.                          |
| CO2 | Demonstrate working knowledge of optical fiber parameters through experimental study.                        |
| CO3 | Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials. |
| CO4 | Characterize semiconductors using Hall effect and energy gap measurement techniques.                         |
| CO5 | Apply scientific methods for accurate data collection, analysis, and technical report writing.               |

**Course Name: Programming for Problem Solving Lab****Course Code: 25CS107ES**

|     |  |
|-----|--|
| CO1 | Demonstrate understanding and application of fundamental C programming constructs. |
| CO2 | Develop, trace, and analyze C programs using control structures.                   |
| CO3 | Decompose complex problems into modular solutions using functions.                 |
| CO4 | Implement string manipulation and file handling techniques.                        |
| CO5 | Apply and evaluate searching and sorting algorithms.                               |

**Course Name: English Language and Communication Skills Lab****Course Code: 25EN108HS**

|     |  |
|-----|--|
| CO1 | Listen actively and identify important information in spoken texts |
| CO2 | Interpret the speech and infer the intention of the speaker        |
| CO3 | Improve their accent for intelligibility                           |
| CO4 | Speak fluently with clarity and confidence                         |

**YEAR: I**

**SEMISTER: II**

**REGULATION: R25**

**Course Name: Ordinary Differential Equations and Vector Calculus      Course Code: 25MA201BS**

|     |   |
|-----|---|
| CO1 | Identify whether the given differential equation of first order is exact or not                           |
| CO2 | Solve higher differential equation and apply the concept of differential equation to real world problems. |
| CO3 | Use the Laplace transforms techniques for solving ODE's.  |
| CO4 | Evaluate the line, surface and volume integrals and converting them from one to another                   |

**Course Name: Engineering Chemistry      Course Code: 25CH202BS**

|     |  |
|-----|--|
| CO1 | Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.   |
| CO2 | Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.  |
| CO3 | Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs. |
| CO4 | Students will learn the basic concepts and properties of polymers and other engineering materials.   |
| CO5 | Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.     |

**Course Name: Python Programming      Course Code: 25CS203ES**

|     |  |
|-----|--|
| CO1 | Write Python programs using variables, operators, expressions, and control structures.               |
| CO2 | Implement Python programs using built-in data structures like lists, tuples, sets, and dictionaries. |
| CO3 | Apply modular and object-oriented programming principles in Python.                                  |
| CO4 | Handle files, exceptions, and apply Python libraries for problem-solving.                            |
| CO5 | Develop small-scale applications in Python for automation and data manipulation.                     |

**Course Name: Data Structures      Course Code: 25CS205ES**

|     |  |
|-----|--|
| CO1 | Understand and implement basic linear data structures like linked lists, stacks and queues.                                      |
| CO2 | Construct and manipulate various trees, including binary search and balanced trees, applying traversal and balancing techniques. |
| CO3 | Analyse and implement multi-way search trees and heaps, applying efficient search algorithms.                                    |
| CO4 | Represent graphs, perform graph traversals, and apply advanced sorting algorithms.   |
| CO5 | Implement hashing techniques, handle collisions, and understand file organization and indexing methods.                          |

**Course Name: Network Analysis and Synthesis****Course Code: 25EE204ES**

|     |   |
|-----|---|
| CO1 | Identify the behavior of electric and magnetic networks.                  |
| CO2 | Analyse transient and study state responses of combined passive elements. |
| CO3 | Examine two port networks using various parameters.                       |
| CO4 | Construct various filter networks and attenuators.                        |
| CO5 | Inspect transfer functions of passive elements for network synthesis.     |

**Course Name: Engineering Chemistry Lab****Course Code: 25CH206BS**

|     |   |
|-----|---|
| CO1 | Students will develop practical skills through hands-on chemistry experiments relevant to engineering.  |
| CO2 | Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.                         |
| CO3 | Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions. |
| CO4 | Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.  |
| CO5 | Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).                         |

**Course Name: Data Structures Lab****Course Code: 25CS207ES**

|     |   |
|-----|---|
| CO1 | Implement and manipulate various types of linked lists with fundamental operations.   |
| CO2 | Design and develop stack and queue data structures using arrays and abstract data types.  |
| CO3 | Apply and implement different sorting algorithms to organize data in ascending order.   |
| CO4 | Construct and traverse complex tree data structures including Binary Search Trees, B-Trees, B+ Trees, AVI Trees, and Red-Black Trees. |
| CO5 | Implement graph traversal algorithms and various hashing functions for efficient data searching and storage.                          |

**Course Name: Applied Python Programming Lab****Course Code: 25EC208ES**

|     |   |
|-----|---|
| CO1 | Outline the fundamental Concepts and illustrate the basic programs. |
| CO2 | Develop python codes for different applications.                    |
| CO3 | Utilize Raspberry PI to implement basic hardware applications.      |

**Course Name: Engineering Workshop****Course Code: 25ME209ES**

|     |  |
|-----|--|
| CO1 | Understand the basic manufacturing processes and operations.                             |
| CO2 | Use hand tools and equipment safely and efficiently.                                     |
| CO3 | Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining |
| CO4 | Read and interpret workshop drawings   |
| CO5 | Develop teamwork, time management, and quality awareness in a workshop environment       |

**Course Name: Electrical Engineering Lab**

**Course Code: 25EC210ES**

|     |  |
|-----|--|
| CO1 | Verify the basic Electrical circuits through different experiments.  |
| CO2 | Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods. |
| CO3 | Analyze the transient responses of R, L and C circuits for different input conditions.                         |

# Civil Engineering

**YEAR: I**

**SEMISTER: I**

**REGULATION: R25**

**Course Name: Matrices and Calculus**

**Course Code: 25MA101BS**

|     |   |
|-----|---|
| CO1 | Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations |
| CO2 | Find the Eigen values and Eigen vectors   |
| CO3 | Reduce the quadratic form to canonical form using orthogonal transformations.                                       |
| CO4 | Solve the applications on the mean value theorems.  |
| CO5 | Find the extreme values of functions of two variables with/ without constraints.                                    |
| CO6 | Evaluate the multiple integrals and apply the concept to find areas, volumes  |

**Course Name: Advanced Engineering Physics**

**Course Code: 25PH102BS**

|     |   |
|-----|---|
| CO1 | Analyze crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.   |
| CO2 | Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.           |
| CO3 | Classify dielectric and magnetic materials and explain their properties, synthesis, and applications.           |
| CO4 | Explain the principles of lasers and fibre optics and their applications in communication and sensing.          |
| CO5 | Understand quantum computing concepts, Classical bits and qubits, Single and multiple qubits and quantum gates. |

**Course Name: Programming for Problem Solving**

**Course Code: 25CS105ES**

|     |   |
|-----|---|
| CO1 | To write algorithms and to draw flowcharts for solving problems.            |
| CO2 | To convert the algorithms/flowcharts to C programs.                         |
| CO3 | To code and test a given logic in the C programming language.               |
| CO4 | To decompose a problem into functions and to develop modular reusable code. |
| CO5 | To use arrays, pointers, strings and structures to write C programs.        |
| CO6 | Searching and sorting problems.   |

**Course Name: Engineering Drawing and Computer Aided Drafting**

**Course Code: 25ME103ES**

|     |   |
|-----|---|
| CO1 | Understand and apply the principles of orthographic and isometric projections.      |
| CO2 | Create sectional views and dimensioned drawings using BIS standards.                |
| CO3 | Use CAD software to generate 2D engineering drawings.                               |
| CO4 | Visualize and construct solid models from 2D views.                                 |
| CO5 | Interpret and produce engineering drawings of mechanical components and assemblies. |
| CO6 | Demonstrate drafting skills for practical and industrial applications.              |

**Course Name: Elements of Electrical and Electronic Engineering** **Course Code: 25EE105ES**

|     |   |
|-----|---|
| CO1 | To analyze and solve electrical circuits using network laws and theorems. |
| CO2 | To understand and analyze basic Electric and Magnetic circuits.           |
| CO3 | To study the working principles of Electrical Machines.                   |
| CO4 | To introduce components of Low Voltage Electrical Installations.          |
| CO5 | To identify and characterize diodes and various types of transistors.     |

**Course Name: Advanced Engineering Physics Lab** **Course Code: 25PH106BS**

|     |  |
|-----|--|
| CO1 | Demonstrate working knowledge of laser systems and determine their characteristics.                          |
| CO2 | Demonstrate working knowledge of optical fiber parameters through experimental study.                        |
| CO3 | Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials. |
| CO4 | Characterize semiconductors using Hall effect and energy gap measurement techniques.                         |
| CO5 | Apply scientific methods for accurate data collection, analysis, and technical report writing.               |

**Course Name: Programming for Problem Solving Lab** **Course Code: 25CS107ES**

|     |  |
|-----|--|
| CO1 | Demonstrate understanding and application of fundamental C programming constructs. |
| CO2 | Develop, trace, and analyze C programs using control structures.                   |
| CO3 | Decompose complex problems into modular solutions using functions.                 |
| CO4 | Implement string manipulation and file handling techniques.                        |
| CO5 | Apply and evaluate searching and sorting algorithms.                               |

**Course Name: Elements of Electrical and Electronic Engineering Lab** **Course Code: 25EE108ES**

|     |   |
|-----|---|
| CO1 | To analyze and solve electrical circuits using network laws and theorems. |
| CO2 | To understand and analyze basic Electric and Magnetic circuits.           |
| CO3 | To study the working principles of Electrical Machines.                   |
| CO4 | To introduce components of Low Voltage Electrical Installations.          |
| CO5 | To identify and characterize diodes and various types of transistors.     |

**Course Name: Engineering Workshop** **Course Code: 25ME109ES**

|     |  |
|-----|--|
| CO1 | Understand the basic manufacturing processes and operations.                             |
| CO2 | Use hand tools and equipment safely and efficiently.                                     |
| CO3 | Perform basic operations in carpentry, fitting, welding, sheet metal work, and machining |
| CO4 | Read and interpret workshop drawings   |
| CO5 | Develop teamwork, time management, and quality awareness in a workshop environment       |

**YEAR: I**

**SEMISTER: II**

**REGULATION: R25**

**Course Name: Ordinary Differential Equations and Vector Calculus**      **Course Code: 25MA201BS**

|     |   |
|-----|---|
| CO1 | Identify whether the given differential equation of first order is exact or not                           |
| CO2 | Solve higher differential equation and apply the concept of differential equation to real world problems. |
| CO3 | Use the Laplace transforms techniques for solving ODE's.  |
| CO4 | Evaluate the line, surface and volume integrals and converting them from one to another                   |

**Course Name: Engineering Chemistry**

**Course Code: 25CH202BS**

|     |  |
|-----|--|
| CO1 | Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.   |
| CO2 | Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.  |
| CO3 | Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs. |
| CO4 | Students will learn the basic concepts and properties of polymers and other engineering materials.   |
| CO5 | Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.     |

**Course Name: English for Skill Enhancement**

**Course Code: 25EN203HS**

|     |   |
|-----|---|
| CO1 | Choose appropriate vocabulary in their oral and written communication.                      |
| CO2 | Demonstrate their understanding of the rules of functional grammar and sentence structures. |
| CO3 | Develop comprehension skills from known and unknown passages.                               |
| CO4 | Write paragraphs, essays, précis and draft letters.   |
| CO5 | Write abstracts and reports in various contexts.  |

**Course Name: Python Programming**

**Course Code: 25CS203ES**

|     |  |
|-----|--|
| CO1 | Write Python programs using variables, operators, expressions, and control structures.               |
| CO2 | Implement Python programs using built-in data structures like lists, tuples, sets, and dictionaries. |
| CO3 | Apply modular and object-oriented programming principles in Python.                                  |
| CO4 | Handle files, exceptions, and apply Python libraries for problem-solving.                            |
| CO5 | Develop small-scale applications in Python for automation and data manipulation.                     |

**Course Name: Building Planning and Construction****Course Code: 25CE204PC**

|     |   |
|-----|---|
| CO1 | Understand the classification of buildings, criteria for site selection, the impact of climate on building design, and the role of orientation and landscaping in planning.             |
| CO2 | Apply the principles of planning and interpret building bye-laws to design functionally efficient, economical, and regulation-compliant buildings.                                      |
| CO3 | Interpret and implement provisions of the National Building Code (NBC) related to residential buildings and understand basic construction techniques including foundations and masonry. |
| CO4 | Identify and analyze various types of floors, roofs, staircases, doors, windows, and lintels used in building construction and their suitability for different design conditions.       |
| CO5 | Demonstrate knowledge of finishing works such as plastering, pointing, and floor finishes, and explain the types, design, and safety aspects of scaffolding, formwork, and centering.   |

**Course Name: Engineering Mechanics for Civil Engineering****Course Code: 25CE205PC**

|     |  |
|-----|--|
| CO1 | Determine resultant of forces acting on a body and analyze equilibrium of a body subjected to a system of forces.            |
| CO2 | Solve problem of bodies subjected to friction.   |
| CO3 | Find the location of centroid and calculate moment of inertia of a given section.  |
| CO4 | Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion. |
| CO5 | Interpret and implement work-energy principle and its applications.  |

**Course Name: Engineering Chemistry Lab****Course Code: 25CH206BS**

|     |   |
|-----|---|
| CO1 | Students will develop practical skills through hands-on chemistry experiments relevant to engineering.  |
| CO2 | Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.                         |
| CO3 | Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions. |
| CO4 | Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.  |
| CO5 | Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).                         |

**Course Name: English Language and Communication Skills Lab****Course Code: 25EN208HS**

|     |  |
|-----|--|
| CO1 | Listen actively and identify important information in spoken texts |
| CO2 | Interpret the speech and infer the intention of the speaker        |
| CO3 | Improve their accent for intelligibility                           |
| CO4 | Speak fluently with clarity and confidence                         |

**Course Name: Python Programming Lab**

**Course Code: 25CS210ES**

|     |   |
|-----|---|
| CO1 | Apply fundamental Python programming concepts to solve basic problems.  |
| CO2 | Implement and manipulate Python data structures including list, tuples, dictionaries, strings, and matrices for data processing.            |
| CO3 | Demonstrate file handling operations, module creation, and exception handling for building robust Python applications.                      |
| CO4 | Utilize Object-Oriented Programming principles in Python to design and implement custom classes and graphical representations using canvas. |
| CO5 | Integrate external Python libraries like NumPy, SciePy, and Tkinter for numerical computing, data visualization, and GUI development.       |

