

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES

FIRST YEAR

Upon completion of the following subjects the students will be able to:

| Course Name: MATHEMATICS-I | |
|-----------------------------------|---|
| Course Code: C101 | |
| CO No. | CO STATEMENT |
| C101.1 | Apply the knowledge of calculus for analysing engineering problems |
| C101.2 | Solve first and second order differential equation using standard method and application to electrical circuits |
| C101.3 | Obtain series solution of differential equation |
| C101.4 | Apply Laplace Transformation to find complete solution to ordinary differential equation |

| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C101.1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| C101.2 | 3 | 2 | - | 2 | - | - | - | - | - | - | - | - | - | - |
| C101.3 | - | - | - | 2 | - | - | - | - | - | - | - | - | - | - |
| C101.4 | 3 | - | - | 2 | - | - | - | - | - | - | - | - | - | - |

| Course Name: PHYSICS | |
|-----------------------------|---|
| Course Code: C102 | |
| CO No. | CO STATEMENT |
| C102.1 | Understand various types of oscillations and their implications, the role of shock waves in various fields and recognize the elastic properties of materials for engineering applications |
| C102.2 | Realize the interaction between time varying electric field and magnetic field, the transverse nature of electromagnetic waves, and various properties of light waves such as interference & diffraction and role of optical fiber in communication. |
| C102.3 | Understand various crystal systems, concepts of fermions and bosons with their distributions functions and study the classification of materials in terms of band theory. |
| C102.4 | Compute Eigen values, Eigen function, momentum of atomic and subatomic particles using time independent one-dimensional Schrodinger wave equation and apprehend theoretical background of laser, construction and working of different types of lasers and its application. |

| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C102.1 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 |
| C102.2 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| C102.3 | 3 | 2 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| C102.4 | 3 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 |

Course Name: Communicative English**Course Code: C105**

| CO No. | CO STATEMENT |
|--------|--|
| C105.1 | Understand the process, basic factors & types of communication, knowledge about fundamental concepts in English grammar and its rectification. |
| C105.2 | Identify the concepts of pronunciation, syllable division, stress, intonation, problem sounds and its application. |
| C105.3 | Enhance communication in a culturally diverse workforce, addressing biases and creating polished business documents for effective written communication. |
| C105.4 | Develop comprehensive workplace communication skills, encompassing impactful presentations, interview techniques, team management, leadership, group discussions, and public speaking. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C105.1 | - | - | - | 1 | - | 2 | 2 | 1 | 2 | 2 | 1 | 2 | - | - |
| C105.2 | - | - | - | 1 | - | 1 | 1 | - | 1 | 1 | 1 | 2 | -- | - |
| C105.3 | - | - | - | 3 | - | 3 | 3 | 2 | 2 | 3 | 3 | 3 | - | - |
| C105.4 | - | - | - | 2 | - | 3 | 2 | 3 | 3 | 2 | 3 | 2 | - | - |

Course Name: Physics Lab**Course Code: C106**

| CO No. | CO STATEMENT |
|--------|---|
| C106.1 | Apprehend the concepts of interference & diffraction of light |
| C106.2 | Understand the principles of operations of semiconductor devices such as PN-Junction, PNP transistor and RC circuit using simple circuits |
| C106.3 | Determine elastic moduli of given material and surface tension of liquid |
| C106.4 | Recognize the resonance concept and its applications and understand the importance of measurement procedure, honest recording, representing the data, reproduction of final results |
| C106.5 | Express the idea of calculation of acceleration due to gravity at any place using the concept of oscillatory system and simple harmonic motion |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C106.1 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 2 |
| C106.2 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 2 |
| C106.3 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 2 |
| C106.4 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 1 | 1 | 2 | 2 |

| Course Name: Basic Electrical Engineering Lab | | | | | | | | | | | | | | |
|--|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C107 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C107.1 | Express the safety rules as per ISS and symbols of different electrical components and the use of various electrical instruments in the laboratory | | | | | | | | | | | | | |
| C107.2 | Demonstrate the working and operational characteristics of dc motor and dc generator | | | | | | | | | | | | | |
| C107.3 | Evaluate the voltage, current, power and power factor of choke coil and study BH curve of a ferromagnetic core | | | | | | | | | | | | | |
| C107.4 | Measure armature and field resistance of DC machines, earth resistance and insulation resistance and demonstrate the internal structure of different machines | | | | | | | | | | | | | |
| C107.5 | Analyse the connection and calibration of single-phase energy meter | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C107.1 | 3 | 3 | 2 | 1 | 3 | 2 | - | - | - | - | - | 1 | 2 | 2 |
| C107.2 | 3 | 3 | 2 | 1 | 3 | 2 | - | - | - | - | - | 1 | 2 | 2 |
| C107.3 | 3 | 3 | 2 | 1 | 3 | 2 | - | - | - | - | - | 1 | 2 | 2 |
| C107.4 | 3 | 3 | 2 | 1 | 3 | 2 | - | - | - | - | - | 1 | 2 | 2 |
| C107.5 | 3 | 3 | 2 | 1 | 3 | 2 | - | - | - | - | - | 1 | 2 | 2 |

| Course Name: Basic Mechanical Engineering Lab | | | | | | | | | | | | | | |
|--|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C108 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C108.1 | To gain fundamental knowledge about steam power plant | | | | | | | | | | | | | |
| C108.2 | To obtain knowledge about two stroke and four stroke engine | | | | | | | | | | | | | |
| C108.3 | To acquire knowledge about different types of refrigerator & air conditioners | | | | | | | | | | | | | |
| C108.4 | To learn about different parts of automobiles | | | | | | | | | | | | | |
| C108.5 | To understand working principles of gear trains | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C108.1 | 2 | 3 | 1 | 2 | 2 | 3 | 2 | - | - | - | - | - | 3 | 3 |
| C108.2 | 2 | 3 | 2 | 2 | 1 | 2 | 3 | - | - | 3 | 1 | - | 2 | 2 |
| C108.3 | 3 | 3 | 2 | 2 | 1 | 2 | - | 2 | - | 2 | 3 | - | 2 | 2 |
| C108.4 | 3 | 2 | 3 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | - | 2 | 3 |
| C108.5 | - | 2 | 2 | 2 | 2 | 2 | - | - | - | 2 | - | - | 2 | 3 |

Course Name: Engineering Graphics & Design Lab**Course Code: C109**

| CO No. | CO STATEMENT |
|---------------|---|
| C109.1 | Use the drawing instruments and Auto CAD software effectively and able to dimension and draw of the given figures |
| C109.2 | To obtain knowledge about different types of scales |
| C109.3 | To obtain knowledge about orthographic projections |
| C109.4 | To know about different types of orthographic projection |
| C109.5 | To acquire knowledge about isometric projection |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C109.1 | 3 | 2 | 3 | 1 | 1 | 2 | 1 | - | - | - | - | - | 3 | 3 |
| C109.2 | 3 | 2 | 3 | 1 | 1 | 2 | 3 | - | - | 2 | 2 | - | 2 | 2 |
| C109.3 | 3 | 2 | 3 | 1 | 3 | 2 | - | 3 | - | 1 | 3 | - | 3 | 2 |
| C109.4 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | - | 1 | 1 | 1 | - | 3 | 2 |

Course Name: English Language Lab**Course Code: C110**

| CO No. | CO STATEMENT |
|---------------|---|
| C110.1 | Understand and apply the sounds of English with precision, using correct stress, tone, and rhythm in listening, speaking, reading, and writing contexts. |
| C110.2 | Develop proficiency in communication through presentations, role-play, and oneon-one interactions, emphasizing word accent, intonation, and rhythm for improved pronunciation and increased vocabulary. |
| C110.3 | Equip students with the ability to use language effectively in professional scenarios such as interviews, group discussions overcoming communication barriers for successful public speaking. |
| C110.4 | Acquire practical skills in resume/CV preparation, report writing, and format creation, enhancing overall writing abilities. |
| C110.5 | Enhance reading comprehension skills for both technical and general texts, enabling students to extract, analyze, and synthesize information efficiently for academic and professional success. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C110.1 | - | - | - | 1 | - | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | - |
| C110.2 | - | - | - | 1 | - | 1 | 1 | - | 1 | 2 | 1 | 1 | - | 2 |
| C110.3 | - | - | - | 2 | - | 3 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | - |
| C110.4 | - | - | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 1 | 1 | - | - |
| C110.5 | - | - | - | 1 | - | - | - | - | - | - | 2 | 2 | 2 | 2 |

Course Name: MATHEMATICS-II**Course Code: C111**

| CO No. | CO STATEMENT |
|---------------|---|
| C111.1 | Apply the knowledge of matrix algebra for solving system of linear equations and compute the inverse of matrices |
| C111.2 | To develop the essential tool of matrices to compute the eigen values and eigen vectors |
| C111.3 | Illustrate the concept of vector differential calculus to understand the solenoidal And irrotational vectors |
| C111.4 | Illustrate the concept of vector integral calculus and exhibit the inter dependence of line, surface and volume integrals |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C111.1 | 2 | 3 | 1 | 2 | 2 | 3 | - | - | - | - | - | 2 | - | - |
| C111.2 | 2 | 3 | - | - | 2 | - | - | - | - | - | - | 2 | - | - |
| C111.3 | - | - | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - |
| C111.4 | - | - | 3 | 2 | 3 | - | - | - | - | - | - | - | - | - |

Course Name: Engineering Mechanics**Course Code: C112**

| CO No. | CO STATEMENT |
|---------------|---|
| C112.1 | To improve the ability of describing objects in static equilibrium including determination of forces, reaction forces, and moments, also to enrich the fundamental concept of friction |
| C112.2 | To assimilating the knowledge for the determination of centroid, and second moment of area of different sections, and their applications |
| C112.3 | To analyze the work done by forces, and subsequent energy transferred from one object to other, and application of work-energy conservation principle for realistic (/Practical) engineering problems |
| C112.4 | To identify the various parameters associated with projectile motion, and application of the principle of dynamics to analyze the curvilinear motion of rigid bodies |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C112.1 | 3 | 3 | 1 | 2 | 1 | - | 2 | - | - | - | 3 | 1 | 3 | 2 |
| C112.2 | 3 | 3 | 2 | 2 | 2 | 2 | - | - | - | 1 | 2 | 1 | 3 | 2 |
| C112.3 | 3 | 1 | 3 | 2 | 1 | 3 | 1 | - | - | - | 1 | - | 2 | 1 |
| C112.4 | 3 | 2 | 3 | 2 | 2 | 1 | - | - | - | 1 | 2 | 1 | 3 | 2 |

| Course Name: Chemistry | | | | | | | | | | | | | | |
|-------------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C113 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C113.1 | Understand the basics of quantum mechanical concepts and spectroscopy | | | | | | | | | | | | | |
| C113.2 | Understand the principle of Phase Rules and applications of systems. | | | | | | | | | | | | | |
| C113.3 | Analyse the quantitative aspects of fuel combustion and the mechanism of corrosion | | | | | | | | | | | | | |
| C113.4 | Preliminary understanding on introductory idea about nano materials | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C113.1 | 3 | - | - | 1 | - | 3 | 2 | - | - | - | - | - | - | - |
| C113.2 | 3 | 2 | - | - | - | -- | 2 | - | - | - | - | - | - | - |
| C113.3 | 3 | 2 | 3 | - | - | 3 | 2 | - | - | - | - | - | - | - |
| C113.4 | 2 | - | - | 2 | - | 3 | 2 | - | - | - | - | - | - | - |

| Course Name: Basic Electronics Engineering | | | | | | | | | | | | | | |
|---|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C114 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C114.1 | Understand the operation and application of semiconductor devices. | | | | | | | | | | | | | |
| C114.2 | Analyze characteristics of FET and fundamentals of integrated circuits. | | | | | | | | | | | | | |
| C114.3 | Apply the feedback amplifiers and Operational amplifiers. | | | | | | | | | | | | | |
| C114.4 | Remember the fundamentals of different digital arithmetic operations and communication system. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C114.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C114.2 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 2 |
| C114.3 | 3 | 2 | 2 | 3 | - | - | - | - | - | - | - | 2 | 2 | 2 |
| C114.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 2 |

| Course Name: Basic Civil Engineering | | | | | | | | | | | | | | |
|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Course Code: C115 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C115.1 | Able to understand the basic concepts of civil engineering. | | | | | | | | | | | | | |
| C115.2 | Able to understand the significance of civil engineering in routine life by knowing importance of surveying, building material & construction techniques. | | | | | | | | | | | | | |
| C115.3 | Able to understand the behavior & properties of soil & fundamentals of irrigation engineering. | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C117.3 | 3 | 3 | 3 | - | 1 | - | - | - | - | - | - | 3 | - | - |
| C117.4 | 3 | 2 | 1 | - | - | - | - | - | - | - | - | 3 | - | - |

Course Name: Basic Electronics Engineering Lab
Course Code: C118

| CO No. | CO STATEMENT |
|--------|--|
| C118.1 | Acquire basic knowledge on electronic devices and components. |
| C118.2 | Design different electronics circuits using semiconductor diodes, BJTs and FETs and analyze their characteristics. |
| C118.3 | Implement operational amplifier circuits. |
| C118.4 | Acquire knowledge on basic digital logic gates and implement digital circuits using universal gates. |
| C118.5 | Analyse and develop the characteristics of BJTs and FETs circuits. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C118.1 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 2 |
| C118.2 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 2 |
| C118.3 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 2 |
| C118.4 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 2 |
| C118.5 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 2 | 2 |

Course Name: Basic Civil Engineering Lab
Course Code: C119

| CO No. | CO STATEMENT |
|--------|---|
| C119.1 | Able to know the different instrument operations in civil engineering work. |
| C119.2 | Able to understand properties & tests on Brick. |
| C119.3 | Able to understand the concept of linear and angular measurement. |
| C119.4 | Able to test on concrete for analyzing quality of materials. |
| C119.5 | Able to understand properties and tests on cement |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C119.1 | 3 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | 3 |
| C119.2 | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | 2 | 3 |
| C119.3 | 3 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | 3 |
| C119.4 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | 3 |
| C119.5 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 1 | 2 | 3 |

| Course Name: Workshop | | | | | | | | | | | | | | |
|------------------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C120 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C120.1 | Acquire knowledge of conventional & CNC (Lathe and Milling Machine). CNC code and part programming for Milling and Turning operations. Different types of hand tool, measuring instruments and machine tools used in Fitting, Carpentry & Smithy work | | | | | | | | | | | | | |
| C120.2 | Know about different types of operations and joints performed in different shops i.e. in Fitting and Carpentry | | | | | | | | | | | | | |
| C120.3 | Explore learning about forging temperature of different types of ferrous metals and different types of operation (e.g. upsetting, edging, flattening and bending etc.) carried out on hot metals to prepare jobs | | | | | | | | | | | | | |
| C120.4 | Acquire knowledge for the preparation of different types of jobs by using conventional/ CNC Lathe and Milling Machines (e.g. facing, step turning, knurling, drilling, boring, taper turning, thread cutting and different methods of indexing for machining gears | | | | | | | | | | | | | |
| C120.5 | Acquire skills in using different precision measuring and marking instruments. Understand the importance of safety precaution in different shops | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C120.1 | 2 | 3 | 3 | 2 | - | 2 | 1 | - | 2 | - | - | 3 | 3 | 3 |
| C120.2 | 3 | 2 | 3 | 1 | 1 | 2 | 3 | - | - | 2 | 2 | - | 3 | 3 |
| C120.3 | 2 | 3 | 3 | 1 | 3 | 2 | - | 3 | - | 1 | 2 | 2 | 2 | 3 |
| C120.4 | 3 | 2 | 3 | 1 | 2 | 1 | 3 | - | 1 | 1 | 1 | - | 2 | 3 |

| Course Name: Programming For Problem Solving Using C Lab | | | | | | | | | | | | | | |
|---|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C121 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C121.1 | Develop C Programs for simple applications making use of basic constructs. | | | | | | | | | | | | | |
| C121.2 | Develop C Programs for simple applications using Arrays and Function. | | | | | | | | | | | | | |
| C121.3 | Develop C Programs involving Functions, Recursion and Pointers. | | | | | | | | | | | | | |
| C121.4 | Develop C Programs involving structures. | | | | | | | | | | | | | |
| C121.5 | Design applications using sequential and Random-access file processing. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C121.1 | 3 | 3 | 3 | 1 | 1 | 2 | - | - | - | - | - | 2 | 2 | 2 |
| C121.2 | 3 | 3 | 3 | 1 | 1 | 2 | - | - | - | - | - | 2 | 2 | 2 |
| C121.3 | 3 | 3 | 3 | 1 | 1 | 2 | - | - | - | - | - | 2 | 2 | 2 |
| C121.4 | 3 | 3 | 3 | 1 | 1 | 2 | - | - | - | - | - | 2 | 2 | 2 |
| C121.5 | 3 | 3 | 3 | 1 | 1 | 2 | - | - | - | - | - | 2 | 2 | 2 |

SECOND YEAR

| Course Name: Engineering Economics | | | | | | | | | | | | | | |
|---|---|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Course Code: C201 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C201.1 | Learn the basic concepts of microeconomic theories and macroeconomic practices in determining the prices of products at different demand and supply positions and their significance in decision-making. | | | | | | | | | | | | | |
| C201.2 | Understand the quantitative effects of changes in cost and revenue on the production of a product and its supply to the market in both periods. | | | | | | | | | | | | | |
| C201.3 | May apply the knowledge of economic theories and principles to solve the discriminations in determining the price of the product and quantity to be sold to earn an expected level of profit. | | | | | | | | | | | | | |
| C201.4 | Analyze the financial systems and subsystems of the country and their impact on the evaluation of business enterprises, engineering projects, and the available alternatives in considering depreciation, taxation, and inflation in society. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C201.1 | 2 | 2 | 2 | - | 2 | - | - | 2 | - | - | 3 | 2 | 1 | - |
| C201.2 | 2 | - | 1 | - | 1 | - | - | - | - | - | 2 | - | - | 1 |
| C201.3 | - | - | - | 2 | 3 | - | - | - | - | - | - | - | 1 | - |
| C201.4 | - | 2 | 3 | - | - | - | 2 | - | - | - | 2 | - | - | 1 |

| Course Name: Evaluation of Internship - I | | | | | | | | | | | | | | |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Course Code: C203 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C203.1 | To excel in career growth prior to Graduation courses. | | | | | | | | | | | | | |
| C203.2 | To correlate the theory to the need of the industrial environment. | | | | | | | | | | | | | |
| C203.3 | To judge one's interest and capabilities treating these as a challenge to work anywhere in the industrial scenario. | | | | | | | | | | | | | |
| C203.4 | To develop a spirit of positive attitude and appreciate the work culture for ultimate success. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C203.1 | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | 3 | 3 | 3 |
| C203.2 | 3 | 3 | 3 | 3 | 3 | - | 3 | - | - | - | - | 2 | 3 | 3 |
| C203.3 | 3 | 3 | 3 | 3 | 3 | - | 2 | - | - | - | - | 3 | 3 | 3 |
| C203.4 | 3 | 3 | 3 | 2 | - | 3 | 2 | - | - | - | - | 2 | 3 | 3 |

| Course Name: Mathematics - III | | | | | | | | | | | | | | |
|---------------------------------------|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C204 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C204.1 | Apply interpolation technique for numerical differentiation and integration and understand concepts of errors associated with them. | | | | | | | | | | | | | |
| C204.2 | Understand and apply the quadrature formulae for numerical integration and concepts of errors associated with them. | | | | | | | | | | | | | |
| C204.3 | Verify the function as probability mass and density function and to use probability distributions in solving physical and engineering problems. | | | | | | | | | | | | | |
| C204.4 | Determine the defectiveness in items / products using probability distributions. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C204.1 | 2 | | - | - | - | 1 | 1 | - | - | - | - | - | - | - |
| C204.2 | - | - | - | - | - | 1 | 2 | - | - | - | - | - | - | - |
| C204.3 | 2 | 2 | - | - | - | | | - | - | - | - | - | - | - |
| C204.4 | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - |

| Course Name: Object Oriented Programming Using JAVA | | | | | | | | | | | | | | |
|--|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C205 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C205.1 | Understand the concept of Object oriented Programming to solve real world problems. | | | | | | | | | | | | | |
| C205.2 | Use the concept of class and object with access control to represent real world entity | | | | | | | | | | | | | |
| C205.3 | Develop multithreaded application and handle Exceptions to avoid abnormal termination of program | | | | | | | | | | | | | |
| C205.4 | Understand the process of Graphical User Interface (GUI) design and implementation Using AWT and swing. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C205.1 | 3 | 2 | 2 | 2 | 1 | - | - | - | 2 | - | 2 | 2 | - | - |
| C205.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | 2 | - | 2 | 2 | - | - |
| C205.3 | 3 | 2 | 3 | 2 | 3 | - | - | - | 2 | - | 2 | 2 | - | - |
| C205.4 | 3 | 2 | 3 | 2 | 3 | - | - | - | 2 | - | 2 | 1 | - | - |

Course Name: OOP Using JAVA Lab**Course Code: C206**

| CO No. | CO STATEMENT |
|---------------|---|
| C206.1 | Develop program based on control statements, array, dynamic array, etc. |
| C206.2 | Apply OOP concepts of Java for problem solving. |
| C206.3 | Apply multithreading and exception handling. |
| C206.4 | Apply the concepts of Java Files, collections and database in real time problem solving |
| C206.5 | Design GUI applications using AWT(Event Handling),Swing components, applets. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C206.1 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | - |
| C206.2 | 3 | 3 | 2 | 3 | 1 | - | - | - | - | - | - | 2 | 3 | 3 |
| C206.3 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 2 | 1 | 3 |
| C206.4 | 3 | 3 | - | 3 | 3 | - | - | - | - | - | - | 2 | 2 | 3 |
| C206.5 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Organizational Behaviour**Course Code: C207**

| CO No. | CO STATEMENT |
|---------------|--|
| C207.1 | To learn and identify the basic concepts of OB, the Relationship between OB and the individual, Theoretical framework (cognitive), behavioristic and social (cognitive) in establishing the rapport Organization. |
| C207.2 | Students will be able to identify the components of individual behavior and apply the concept of Attitude, personality and perception |
| C207.3 | The students will be able to analyze behavior of individuals and groups in organizations in terms of the key factors that influence organizational behavior and demonstrate skills required for working in groups(Team Building) |
| C207.4 | To analyze the Organizational Culture and forces that stimulates change in the Concept of Workplace Spirituality in applying learning Culture in the Organization. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C207.1 | - | - | - | - | - | - | - | 2 | 2 | 2 | - | - | 1 | - |
| C207.2 | - | - | 1 | - | - | 2 | - | 2 | 2 | - | 2 | - | 1 | - |
| C207.3 | - | - | - | - | - | - | - | - | 2 | - | 3 | - | 1 | - |
| C207.4 | - | - | - | - | - | 2 | - | - | - | - | 2 | - | 1 | - |

| Course Name: Mechanics of Solid | | | | | | | | | | | | | | |
|--|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C210 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C210.1 | To understand the concepts of stress and strain as well as the stress-strain relationships and to analyze the axially loaded members and relationship among elastic constants | | | | | | | | | | | | | |
| C210.2 | To determine the biaxial state of stress both analytically and graphically using Mohr's circle and calculation of stresses in thin vessels. | | | | | | | | | | | | | |
| C210.3 | Illustration of shear force, bending moment diagram, bending of beams and to evaluate slope and deflection of different beams and to analyse long and short column. | | | | | | | | | | | | | |
| C210.4 | Analysis of solid, hollow shafts and close coiled helical spring under torsion, and to illustrate testing of materials. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C210.1 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | 2 |
| C210.2 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | 2 |
| C210.3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | 2 |
| C210.4 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | 2 |

| Course Name: Mechanics of Solid Lab | | | | | | | | | | | | | | |
|--|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C211 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C211.1 | Evaluate different stresses and strain for tensile and compressive loads using UTM | | | | | | | | | | | | | |
| C211.2 | Compute the shear strength, bending strength of the specimen using UTM | | | | | | | | | | | | | |
| C211.3 | Assessment of spring constant | | | | | | | | | | | | | |
| C211.4 | Measurement of strain and load | | | | | | | | | | | | | |
| C211.5 | Analyze failure of material by Fatigue test | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C211.1 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 |
| C211.2 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 |
| C211.3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 |
| C211.4 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 |
| C211.5 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 |

Course Name: Fluid Mechanics and Hydraulic Machines Lab**Course Code: C212**

| CO No. | CO STATEMENT |
|---------------|--|
| C212.1 | Evaluate the Metacentric height & implement to stability of floating bodies |
| C212.2 | Determine the force due to impact of jets. |
| C212.3 | Examine the performances of different types of Turbines. |
| C212.4 | Analyze the performance characteristics of Centrifugal & Reciprocating Pumps |
| C212.5 | Testing the performance characteristics of Gear Pump. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C212.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C212.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C212.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C212.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Kinematics And Dynamics of Machines**Course Code: C213**

| CO No. | CO STATEMENT |
|---------------|--|
| C213.1 | Acquire basic knowledge about the mechanisms and study their inversions, also learn to calculate Transmission angle, toggle position, Mechanical advantage & mechanisms to evaluate velocity and acceleration of different links |
| C213.2 | Explore the basic knowledge on Gears and Gear trains, Force analysis, Interference, Undercutting of gears. |
| C213.3 | Static and inertia force analysis of slider crank mechanism to determine force and couple acting on different links |
| C213.4 | Understand the effect of friction in screw jack, clutches and bearings and learn about power transmission through flexible mechanical elements.& Classify and analyze brakes and dynamometers |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C213.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C213.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C213.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C213.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Engineering Thermodynamics**Course Code: C214**

| CO No. | CO STATEMENT |
|--------|---|
| C214.1 | To improve the ability of describing objects in static equilibrium including determination of forces, reaction forces, and moments, also to enrich the fundamental concept of friction |
| C214.2 | To assimilating the knowledge for the determination of centroid, and second moment of area of different sections, and their applications |
| C214.3 | To analyze the work done by forces, and subsequent energy transferred from one object to other, and application of work-energy conservation principle for realistic (/Practical) engineering problems |
| C214.4 | To identify the various parameters associated with projectile motion, and application of the principle of dynamics to analyze the curvilinear motion of rigid bodies |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C214.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C214.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C214.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C214.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Introduction to Physical Metallurgy and Engineering Materials**Course Code: C216**

| CO No. | CO STATEMENT |
|--------|--|
| C216.1 | To comprehend a systematic understanding of different crystal structures and their effects on material properties. |
| C216.2 | To analyse the plastic deformation of metals in different working environment and understanding the concept of alloy/solid solution formation. |
| C216.3 | To evaluate critically the relevance of phase diagrams, isothermal transformation diagrams and TTT diagrams to understanding real alloys and their microstructure. |
| C216.4 | To study the complex interplay between microstructure, processing and engineering properties of Optical fibres, plastics, ceramics and composite materials. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C216.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C216.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C216.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C216.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Mechanical Measurement, Metrology & Reliability**Course Code: C217**

| CO No. | CO STATEMENT |
|---------------|--|
| C217.1 | Understand about the various measurement methods, systems and characteristics of measuring instruments. |
| C217.2 | Comprehend the operation of various transducers and strain gauges for strain measurement. |
| C217.3 | Analyze the concepts and working of pressure measurement transducers, flow measurement meters and temperature measurement devices. |
| C217.4 | Gain a comprehensive understanding of principles of measurement, reliability, maintainability and availability. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C217.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C217.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C217.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C217.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Digital Systems Design**Course Code: C218**

| CO No. | CO STATEMENT |
|---------------|--|
| C218.1 | Understanding Syntax and structure of c programming language to develop efficient code to solve real world problems |
| C218.2 | Apply conditional branching and iterative statements to control the sequence of program. |
| C218.3 | Decompose a problem into functions to implement code reusability |
| C218.4 | Develop programs using pointer, structure and implement various searching and sorting techniques for a list of items |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C218.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C218.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C218.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C218.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Kinematics & Dynamics of Machines Laboratory**Course Code: C219**

| CO No. | CO STATEMENT |
|---------------|---|
| C219.1 | Design of a four bar chain. |
| C219.2 | Gain the knowledge about Brake System& Calculate efficiency of a screw jack |
| C219.3 | Analyze the working principle of different gear trains. |
| C219.4 | Obtain knowledge about Bifilar system & Compound pendulum |
| C219.5 | Determine the braking torque using dynamometer. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C219.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C219.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C219.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C219.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

Course Name: Engineering Thermodynamics Laboratory**Course Code: C220**

| CO No. | CO STATEMENT |
|---------------|--|
| C220.1 | Understand the practical operation of 2 stroke and 4 stroke I.C engines |
| C220.2 | Demonstrate the working of Refrigeration system, Steam powerplant and Gas turbine powerplant, also the working of Impulse and Reaction steam turbines. |
| C220.3 | Analyze the performance reciprocating air compressor. |
| C220.4 | Examine the performance of gear pump. |
| C220.5 | Analyze the performance of 4-stroke single cylinder C.I engine with the variation of various performances like load and speed. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C220.1 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C220.2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C220.3 | 3 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| C220.4 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

THIRD YEAR

Course Name: Evaluation of Summer Internship-II

Course Code: C301

| CO No. | CO STATEMENT |
|---------------|---|
| C301.1 | To excel in career growth prior to Graduation courses |
| C301.2 | To correlate the theory to the need of the industrial environment |
| C301.3 | To judge one's interest and capabilities treating these as a challenge to work anywhere in the industrial scenario. |
| C301.4 | To develop a spirit of positive attitude and appreciate the work culture for ultimate success. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C301.1 | 3 | 3 | 3 | 3 | 3 | - | | - | - | - | - | 3 | 3 | 3 |
| C301.2 | 3 | 3 | 3 | 3 | 3 | - | 3 | - | - | - | - | 2 | 3 | 3 |
| C301.3 | 3 | 3 | 3 | 3 | 3 | - | 2 | - | - | - | - | 3 | 3 | 3 |
| C301.4 | 3 | 3 | 3 | 2 | | 3 | 2 | - | - | - | - | 2 | 3 | 3 |

Course Name: Basic Manufacturing Processes

Course Code: C302

| CO No. | CO STATEMENT |
|---------------|--|
| C302.1 | To describe about Pattern Making; pattern material, pattern allowances and types of casting processes and understand the working of various casting methods. |
| C302.2 | To understand and access the importance of welding processes in manufacturing and apply knowledge to select appropriate welding process based on the type of industrial application. |
| C302.3 | To learn about powder metallurgy process, rolling process ,forging process.. |
| C302.4 | To summarize some of the basic sheet metal forming processes like extrusion, , wire drawing and explosive forming proces |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C302.1 | 3 | 3 | 3 | 3 | 3 | - | | - | - | - | - | 3 | 3 | 3 |
| C302.2 | 3 | 3 | 3 | 3 | 3 | - | 3 | - | - | - | - | 2 | 3 | 3 |
| C302.3 | 3 | 3 | 3 | 3 | 3 | - | 2 | - | - | - | - | 3 | 3 | 3 |
| C302.4 | 3 | 3 | 3 | 2 | | 3 | 2 | - | - | - | - | 2 | 3 | 3 |

Course Name: Artificial Intelligence and Machine Learning**Course Code: C303**

| CO No. | CO STATEMENT |
|---------------|---|
| C303.1 | Demonstrate Ability to comprehend AI and Expert System to analyze and map real world activities to digital world. |
| C303.2 | Ability to identify problems that are amenable solved by AI methods. |
| C303.3 | Ability to Acting under Uncertainty, Representing Knowledge in an Uncertain Domain. |
| C303.4 | Explain Explanation-based Learning, Discovery, Analogy, Formal Learning Theory, Neural Net Learning and Genetic Learning. Expert Systems: Representing and Using Domain Knowledge, Expert System. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C303.1 | 3 | 2 | 2 | 2 | 1 | - | - | - | 2 | - | 2 | 2 | 1 | 1 |
| C303.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | 2 | - | 2 | 2 | 1 | 1 |
| C303.3 | 3 | 2 | 3 | 2 | 3 | - | - | - | 2 | - | 2 | 2 | 1 | 1 |
| C303.4 | 3 | 2 | 3 | 2 | 3 | - | - | - | 2 | - | 2 | 1 | 1 | 1 |

Course Name: Future Ready Contributor Program**Course Code: C304**

| CO No. | CO STATEMENT |
|---------------|--|
| C304.1 | Improve the employability of students by giving them the right work ethic and thinking that employers are looking for contributors and not just workers. |
| C304.2 | Build their confidence and career-worthiness with which they can develop into future-ready contributors with ability to navigate a career in a volatile world. |
| C304.3 | Improve their ability to engage better in the workplace and to apply contributor thinking to real-world or career relevant challenges. |
| C304.4 | Empower technical professionals to broaden career options and create opportunities, encouraging them to contribute positively to their communities and state. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C304.1 | - | - | - | 2 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | | |
| C304.2 | - | - | - | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | | |
| C304.3 | - | - | - | 1 | 2 | 2 | 1 | 3 | 3 | 1 | 1 | 3 | | |
| C304.4 | - | - | - | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | | |

| Course Name: Optimization in Engineering | | | | | | | | | | | | | | |
|---|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C306 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C306.1 | Analyze the concept of simplex, Big M & Two phase method and apply them in solving problems | | | | | | | | | | | | | |
| C306.2 | To familiarize industrial problems with various methods of solving transportation problem | | | | | | | | | | | | | |
| C306.3 | Describe the concept of single variable optimization problems and Analyze solution of nonlinear programming problems | | | | | | | | | | | | | |
| C306.4 | Understand the concept of Queuing theory and to apply them in real life | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C306.1 | 3 | 2 | 2 | - | - | - | 1 | - | - | - | 3 | - | - | - |
| C306.2 | 3 | | 2 | - | - | - | 1 | - | - | - | 3 | - | - | - |
| C306.3 | 3 | | 3 | - | 1 | | | - | - | - | - | - | 1 | - |
| C306.4 | 2 | 2 | 2 | - | - | - | 2 | - | 1 | - | 3 | - | - | - |

| Course Name: SEMINAR-1 | | | | | | | | | | | | | | |
|-------------------------------|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C307 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C307.1 | Acquired the basic skills for performing literature survey and paper presentation on Mechanical Engineering related with Societal/Environmental/Ethical topic | | | | | | | | | | | | | |
| C307.2 | To effectively communicate by making an oral presentation before an evaluation committee | | | | | | | | | | | | | |
| C307.3 | Describe the current topics in Mechanical Engineering and related areas based on current publications. | | | | | | | | | | | | | |
| C307.4 | To impart skills in preparing detailed report describing the topics of the seminar | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C307.1 | 2 | 3 | 2 | 2 | 1 | - | - | - | - | 2 | - | - | 2 | 2 |
| C307.2 | 2 | 3 | 2 | 2 | 1 | - | - | - | - | 2 | - | - | 2 | 2 |
| C307.3 | 2 | 3 | 2 | 2 | 1 | - | - | - | - | 2 | - | - | 2 | 2 |
| C307.4 | 2 | 3 | 2 | 2 | 1 | - | - | - | - | 2 | - | - | 2 | 2 |

| Course Name: Mechanisms and Machines | | | | | | | | | | | | | | |
|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Course Code: C308 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C308.1 | Able to know the different instrument operations in civil engineering work | | | | | | | | | | | | | |
| C308.2 | Able to understand properties & tests on different building materials (Cement,Brick). | | | | | | | | | | | | | |
| C308.3 | Able to understand the concept of linear and angular measurement | | | | | | | | | | | | | |

| Course Name: Rapid Manufacturing Processes | | | | | | | | | | | | | | |
|---|---|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C311 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C311.1 | Understanding different steps in rapid manufacturing process and reverse engineering | | | | | | | | | | | | | |
| C311.2 | Learn about errors and different RP techniques | | | | | | | | | | | | | |
| C311.3 | Gain knowledge about stereo lithography and other RP processes | | | | | | | | | | | | | |
| C311.4 | Obtain knowledge about laminated object manufacturing other Internet based software and collaboration tools | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C311.1 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 2 | 1 |
| C311.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C311.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C311.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

| Course Name: Basic Manufacturing Processes Lab | | | | | | | | | | | | | | |
|---|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C312 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C312.1 | Demonstrate various processes used for casting, joining, and foundry Practices | | | | | | | | | | | | | |
| C312.2 | Fabricate weldments using TIG/MIG welding brazing and soldering | | | | | | | | | | | | | |
| C312.3 | Demonstrate various processes used for carpentry and sheet metal | | | | | | | | | | | | | |
| C312.4 | Demonstrate various processes used for rolling and Extrusion processes | | | | | | | | | | | | | |
| C312.5 | Demonstrate various types patterns in casting | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C312.1 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 2 | 1 |
| C312.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C312.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C312.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

| Course Name: Mechanisms and Machines LAB | | | | | | | | | | | | | | |
|---|------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Course Code: C313 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C313.1 | Analyze the working model of a cam | | | | | | | | | | | | | |

| | |
|--------|---|
| C313.2 | Evaluate the gyroscopic effect and plot the characteristic curve of different governors |
| C313.3 | Compute the critical speed of a rotating shaft |
| C313.4 | Perform static and dynamic balancing of rotating masses |
| C313.5 | Illustrate interference and undercutting of a gear drive |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C313.1 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 2 | 1 |
| C313.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C313.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C313.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

Course Name: Heat Transfer LAB

Course Code: C314

| CO No. | CO STATEMENT |
|--------|--|
| C314.1 | To understand the thermal conductivity and heat transfer coefficients. |
| C314.2 | To acquire knowledge about surface emissivity and heat exchanger |
| C314.3 | To obtain knowledge about fins and critical heat flux. |
| C314.4 | To gain knowledge about Stefan Boltzman's law. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C314.1 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 2 | 1 |
| C314.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C314.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C314.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

Course Name: Design of Machine Elements

Course Code: C315

| CO No. | CO STATEMENT |
|--------|--|
| C315.1 | Acquire knowledge of conventional & CNC (Lathe and Milling Machine). CNC code and part programming for Milling and Turning operations. Different types of hand tool, measuring instruments and machine tools used in Fitting, Carpentry & Smithy work |
| C315.2 | Know about different types of operations and joints performed in different shops i.e. in Fitting and Carpentry |
| C315.3 | Explore learning about forging temperature of different types of ferrous metals and different types of operation (e.g. upsetting, edging, flattening and bending etc.) carried out on hot metals to prepare jobs |
| C315.4 | Acquire knowledge for the preparation of different types of jobs by using conventional/ CNC Lathe and Milling Machines (e.g. facing, step turning, knurling, drilling, boring, taper turning, thread cutting and different methods of indexing for machining gears |

| | | | | | | | | | | | | | | |
|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C317.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C317.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

| Course Name: Design of Machine Elements Lab | | | | | | | | | | | | | | |
|--|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C318 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C318.1 | Develop the working model of any machine element. | | | | | | | | | | | | | |
| C318.2 | Explore the mechanism of different mechanical joint. | | | | | | | | | | | | | |
| C318.3 | Develop Detailed and Part Drawings from Assembled Drawings of Machine Components | | | | | | | | | | | | | |
| C318.4 | Design and drawing of knuckle joint and flange coupling. | | | | | | | | | | | | | |
| C318.5 | Design of spring. & bearing. | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C318.1 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 2 | 1 |
| C318.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C318.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C318.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

| Course Name: Machining Science and Technology Lab | | | | | | | | | | | | | | |
|--|--|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| Course Code: C319 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C319.1 | Execute various operations on Lathe Machine to produce required component | | | | | | | | | | | | | |
| C319.2 | Carry out gear cutting in milling machine & working with reciprocating machine | | | | | | | | | | | | | |
| C319.3 | Determine the cutting force using dynamometer tool | | | | | | | | | | | | | |
| C319.4 | Identify the concepts of Non-traditional machining processes along Laser spot welding. | | | | | | | | | | | | | |
| C319.5 | Recognize the working principle of CNC Lathe and Milling machine | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C319.1 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 2 | 1 |
| C319.2 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C319.3 | 3 | 3 | 1 | 3 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| C319.4 | 2 | 2 | 1 | 2 | 1 | - | - | - | - | - | - | 2 | 2 | 2 |

FOURTH YEAR

Course Name: Entrepreneurship Development

Course Code: C401

| CO No. | CO STATEMENT |
|---------------|---|
| C401.1 | Understanding the nature of entrepreneurship and being able to foster an entrepreneurial culture. |
| C401.2 | Create and design strategies for the successful implementation of ideas. |
| C401.3 | Analyze the role of agencies in the promotion of entrepreneurship in the country. |
| C401.4 | Assess the constraints to overcome the risks from failure due to sickness and the role of Banks and Governments in reviving the industries. |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C401.1 | 1 | 1 | - | 2 | - | - | 2 | - | - | 3 | 3 | - | - | 1 |
| C401.2 | - | - | 2 | - | - | - | 1 | 2 | - | 2 | 2 | - | - | 1 |
| C401.3 | - | - | - | 2 | - | - | 3 | - | 3 | 2 | 3 | - | - | 1 |
| C401.4 | - | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - | 1 |

Course Name: Green Technology

Course Code: C402

| CO No. | CO STATEMENT |
|---------------|--|
| C402.1 | To present different concepts of green technologies. |
| C402.2 | To acquire principles of Energy efficient technologies. |
| C402.3 | To impart knowledge on the methods of reducing CO2 levels in atmosphere. |
| C402.4 | To learn the importance of green fuels and its impact on environment |

CO-PO/PSO Mapping

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| C402.1 | 2 | - | 3 | 2 | - | 2 | 1 | - | - | - | - | - | 2 | 2 |
| C402.2 | 1 | - | - | 3 | - | - | 1 | - | - | - | - | - | 1 | 1 |
| C402.3 | 1 | - | 2 | - | - | 2 | 1 | - | - | - | - | - | 1 | 1 |
| C402.4 | 2 | - | - | 3 | - | 2 | 1 | - | - | - | - | - | 2 | 2 |

Course Name: Minor Project

Course Code: C404

| CO No. | CO STATEMENT |
|---------------|--|
| C404.1 | Define problem and suggest a feasible, cost effective, ecofriendly solution for the benefit of the society |
| C404.2 | Discuss the relation of the project to literature and engineering knowledge |
| C404.3 | Demonstrate properly to complete the project within the scheduled time |

| C404.4 | Analyse project with proper methodology and team spirit | | | | | | | | | | | | | |
|--------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C404.5 | Evaluate and validate the project | | | | | | | | | | | | | |
| | Generate thesis/project report as per the standard norm | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C404.1 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C404.2 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C404.3 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C404.4 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C404.5 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C404.6 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |

| Course Name: SEMINAR-II | | | | | | | | | | | | | | |
|--------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Course Code: C405 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C405.1 | Acquired the basic skills for performing literature survey and paper presentation on Mechanical Engineering related with Societal/Environmental/Ethical topic | | | | | | | | | | | | | |
| C405.2 | To effectively communicate by making an oral presentation before an evaluation committee | | | | | | | | | | | | | |
| C405.3 | Describe the current topics in mechanical engineering and related areas based on current publications. | | | | | | | | | | | | | |
| C405.4 | To impart skills in preparing detailed report describing the topics of the seminar | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C405.1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C405.2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C405.3 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C405.4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C405.5 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 |
| C405.6 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 |

| Course Name: Comprehensive Viva Voce | | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Course Code: C406 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C406.1 | Students will be able to recall and refresh fundamental concepts which they have learnt in previous semesters. | | | | | | | | | | | | | |
| C406.2 | Students will be able to Improve the understanding of different subjects learnt in previous semesters. | | | | | | | | | | | | | |
| C406.3 | Students will be able to enhance their interview facing skills | | | | | | | | | | | | | |

| C406.4 | Students will be able to Improve the success rate in competitive examinations and higher education | | | | | | | | | | | | | |
|--------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C406.1 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | 3 | 2 | 2 |
| C406.2 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | 3 | | |
| C406.3 | 2 | 2 | 2 | - | - | - | - | - | - | 3 | - | - | 2 | 2 |
| C406.4 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | - | 3 | 2 | 2 |

| Course Name: MAJOR PROJECT | | | | | | | | | | | | | | |
|-----------------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Course Code: C407 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C407.1 | Define problem and suggest a feasible, cost effective, ecofriendly solution for the benefit of the society | | | | | | | | | | | | | |
| C407.2 | Discuss the relation of the project to literature and engineering knowledge | | | | | | | | | | | | | |
| C407.3 | Demonstrate properly to complete the project within the scheduled time | | | | | | | | | | | | | |
| C407.4 | Analyse project with proper methodology and team spirit | | | | | | | | | | | | | |
| C407.5 | Evaluate and validate the project | | | | | | | | | | | | | |
| | Generate thesis/project report as per the standard norm | | | | | | | | | | | | | |
| CO-PO/PSO Mapping | | | | | | | | | | | | | | |
| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C407.1 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C407.2 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C407.3 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C407.4 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C407.5 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |
| C407.6 | 3 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |

| Course Name: Refrigeration and Air Conditioning | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Course Code: C408 | | | | | | | | | | | | | | |
| CO No. | CO STATEMENT | | | | | | | | | | | | | |
| C408.1 | To illustrate the basic concepts of Air-refrigeration system, and to understand the concept of simple vapour compression system and multi stage vapour compression systems | | | | | | | | | | | | | |
| C408.2 | Introduction to Vapour Absorption System, Electro-flux and thermoelectric Refrigeration system. | | | | | | | | | | | | | |
| C408.3 | To comprehend the classifications of Refrigerants and their properties. Understanding the concept of air-conditioning system, and its applications towards human comfort | | | | | | | | | | | | | |
| C408.4 | To obtain knowledge about different psychometric processes and solving the problems on psychometrics | | | | | | | | | | | | | |

