



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with B++ Grade, ISO 9001:2015 Certified Institution

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

R20 REGULATION- ALL FIRST YEAR COURSES

| Course Name | CO No. | Course Outcomes | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO1 0 | PO1 1 | PO1 2 |
|--------------------------------------|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 20AD01 Computational Programming | CO1 | Understand the syntax and semantics of programming language constructs. | 2 | 3 | - | - | - | - | - | - | - | - | - | - |
| | CO2 | Understand the text processing using strings and arrays. | 2 | 3 | - | - | - | - | - | - | - | - | - | - |
| | CO3 | Apply user defined functions to solve a given problem. | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| | CO4 | Analyze the storage representation using the derived data types such as structures and unions. | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| | CO5 | Create permanent storage to data processed in a program using files. | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| 20AD51 Computational Programming Lab | CO1 | Apply control structures of C in solving computational problems. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | - | 2 |
| | CO2 | Implement functions and use modular programming in problem solving. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | - | 2 |
| | CO3 | Create user defined datatypes and perform file operations. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | - | 2 |

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|---|------------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 20AE01 Elements of Aerospace Engineering | CO1 | Describe functions of various external and internal components of an airplane. | 3 | 3 | 1 | 2 | - | - | 2 | - | - | 1 | 2 | 3 |
| | CO2 | Classify the various forces and moments acting on an airfoil | 3 | 3 | 1 | 2 | - | - | 2 | - | - | 1 | 2 | 3 |
| | CO3 | Describe the working principles of various aircraft engine systems. | 3 | 3 | 1 | 2 | - | - | 2 | - | - | 1 | 2 | 3 |
| | CO4 | Describe the basic aspects of space flight | 3 | 3 | 1 | 2 | 2 | - | 2 | - | - | 1 | 2 | 3 |
| 20CE01 Surveying | CO1 | Understand the basic principles involved in linear and angular measurements, functioning of total station, levelling measurements and characteristic properties of simple curve | 1 | 1 | 2 | 2 | - | 3 | 2 | 2 | 1 | 2 | 3 | - |
| | CO2 | Develop the longitudinal, lateral and contour profiles of a given area using fundamental principles of levelling. | 2 | - | 2 | - | 2 | - | - | - | - | 2 | - | - |
| | CO3 | Calculate the area and volume of required boundaries. | 1 | 1 | - | 2 | - | - | 2 | 2 | 1 | 2 | - | - |

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|---|--------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | | ground using principles of leveling | | | | | | | | | | | | |
| 20CE52 Civil Engineering Drafting Techniques | CO1 | Draw simple objects based on principles of geometry. | 2 | 2 | - | 1 | - | - | - | - | - | - | - | - |
| | CO2 | Sketch the projections of an object based on the angles of projection. | 2 | 2 | - | 1 | - | - | - | - | - | - | - | - |
| | CO3 | Draft simple objects using ArchiCAD | 2 | 2 | 2 | 2 | - | - | - | - | 1 | - | - | - |
| | CO4 | Develop, draw and edit simple objects related to civil engineering applications using ArchiCAD. | 2 | 2 | 2 | 2 | - | - | - | - | 1 | - | - | - |
| 20CE53 Basic Civil and Mechanical Engineering Lab | CO1 | Find the Viscosity of different oils using Viscometers. | 3 | 1 | 1 | 3 | - | - | - | - | 2 | - | - | - |
| | CO2 | Analyze valve and port timing diagrams in I.C engines | 2 | 2 | - | 3 | - | - | - | - | 2 | - | - | 1 |
| | CO3 | Determine the performance parameters of hydraulic turbines. | 3 | 3 | 1 | 3 | - | - | - | - | 2 | - | - | - |
| | CO4 | Conduct the Reynolds experiment to decide the flow classification | 2 | 2 | 1 | 3 | - | - | - | - | 2 | - | - | 1 |
| | CO5 | Evaluate Bernoulli's principles in pipe flows. | 3 | 2 | - | 3 | - | - | - | - | 2 | - | - | 2 |

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|--------------------------------|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | | characteristic roots and Generating functions. | | | | | | | | | | | | |
| 20CS05 Python Programming | CO1 | Identify basic building blocks of python to solve mathematical problems. | 3 | | 2 | - | - | - | - | - | - | - | - | - |
| | CO2 | Apply the in-built data structures like list, tuple, set and dictionary for solving problems. | - | 3 | 2 | - | 1 | - | - | - | - | - | - | - |
| | CO3 | Use exception-handling mechanism to catch run-time errors. | - | 3 | 2 | - | 2 | - | - | - | - | - | - | - |
| | CO4 | Demonstrate compelling concepts about string manipulation, regular expressions, and file handling. | - | 3 | 2 | - | 2 | - | - | - | - | - | - | - |
| | CO5 | Demonstrate object-oriented programming principles of python. | - | 3 | 2 | - | 2 | - | - | - | - | - | - | - |
| 20CS51 Programming for Problem | CO1 | Apply control structures of C in solving computational problems. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | | 2 |
| | CO2 | Implement derived data types & use modular | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | | 2 |

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|--|------------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | | programming in problem solving. | | | | | | | | | | | | |
| | CO3 | Implement user defined data types and perform file operations. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | | 2 |
| | CO4 | Improve individual / teamwork skills, communication & report writing skills with ethical values. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | | 2 |
| 20CS52 Digital Logic Design Lab | CO1 | Implement basic logic gates and special logic gates using NAND and NOR gates. | 2 | 1 | 3 | 1 | 3 | 1 | - | - | - | - | - | - |
| | CO2 | Design combinational circuits like half-adders, full-adders, decoders, encoders, multiplexers. | 1 | 2 | 3 | 1 | 3 | 1 | - | - | - | - | - | - |
| | CO3 | Design sequential digital circuits like flip-flops, Shift registers, and Counters. | 1 | 2 | 3 | 1 | 3 | - | - | - | - | - | - | - |
| | CO4 | Improve individual / teamwork skills, communication & report writing skills with ethical values. | - | - | - | - | - | - | - | - | 2 | 2 | 2 | - |

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|-------------------------------|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 20CS53 Data Structures Lab | CO1 | Implement Linear Data Structures using array and Linked list. | - | 2 | 1 | - | 1 | - | - | - | - | - | - | - |
| | CO2 | Implement Various Sorting Techniques. | - | 2 | 1 | - | 1 | - | - | - | - | - | - | - |
| | CO3 | Implement Non-Linear Data Structure such as Trees & Graphs. | - | 2 | 1 | - | 1 | - | - | - | - | - | - | - |
| | CO4 | Improve individual / teamwork skills, communication & report writing skills with ethical values. | - | - | - | - | - | - | - | 2 | 2 | 2 | - | - |
| 20CS54 Python Programming Lab | CO1 | Apply building blocks of Python in solving computational problems. | 3 | - | - | 2 | 1 | - | - | - | - | - | - | - |
| | CO2 | Implement in-built data structures available in Python to solve computational problems. | - | 3 | 2 | 3 | 2 | - | - | - | - | - | - | - |
| | CO3 | Implement modular programming, string manipulations and Object-oriented programming in python. | - | 3 | 2 | 3 | 2 | - | - | - | - | - | - | - |
| | CO4 | Improve individual / teamwork skills, communication & report | - | - | - | - | - | - | - | 2 | 2 | 2 | - | - |

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| | | writing skills with ethical values. | | | | | | | | | | | | |
| 20CS55 Shell Scripting | CO1 | Understand the basic unix/linux commands. | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | 2 |
| | CO2 | Learn importance of shell scripting. | 3 | 2 | 3 | 1 | - | - | - | - | - | - | - | 2 |
| | CO3 | Apply shell programming to various files. | 3 | 2 | 3 | 1 | - | - | - | - | - | - | - | 2 |
| | CO4 | Improve individual / teamwork skills, communication & report writing skills with ethical values. | - | - | - | - | - | - | - | 2 | 2 | 2 | - | - |
| 20EC01 Electronic Devices & Circuits | CO1 | Identify the types of Diodes, Transistors, FETs, Biasing techniques and their comparisons to select the best approaches for designing the electronic circuits using Devices and components. | 2 | 3 | 1 | - | - | 3 | 1 | - | - | - | 1 | 2 |
| | CO2 | Interpret the mathematical models of Currents & Voltages of Diodes, Bipolar Junction Transistors and Field Effect Transistors and | 2 | 1 | 2 | 1 | - | 3 | 1 | - | - | - | - | 1 |

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|-------------------------------|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | | biasing of BJT and FET using fundamental circuits. | | | | | | | | | | | | |
| | CO3 | Apply the knowledge of diodes, transistors and filters for designing the rectifiers, Filters, Regulators and Amplifier circuits using Devices and components. | 3 | 1 | 1 | - | - | - | 1 | - | - | - | - | - |
| | CO4 | Analyze the characteristics of Diodes, Bipolar Junction Transistors, Field Effect Transistors and their equivalent models using Characteristics and mathematical models. | 1 | 3 | - | - | - | - | - | - | - | - | - | 1 |
| 20EC02 Digital Logic Circuits | CO1 | Summarize the key differences between number systems and their usage in Digital electronics circuits. | 2 | 3 | 1 | - | - | 3 | 1 | - | - | - | 1 | 2 |
| | CO2 | Identify the minimization techniques of Boolean expressions to implement digital circuits using basic | 2 | 1 | 2 | 1 | - | 3 | 1 | - | - | - | - | 1 |

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|--|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO3 | Apply the knowledge of diodes, Capacitors and transistors for the realization of rectifiers, regulators, Clippers and Clampers circuits. | 3 | 1 | 1 | - | - | - | - | - | - | - | 1 | 1 |
| | CO4 | Adapt effective Communication, presentation and report writing skills | - | - | - | - | - | - | - | - | 3 | 2 | - | - |
| 20EC52 Digital Logic Circuits Lab Lab | CO1 | Demonstrate the functionality of Logic gates, Flip-flops, Shift registers and Counters. | 2 | 2 | 1 | 2 | 2 | - | - | - | - | - | - | 2 |
| | CO2 | Apply the Boolean minimization methods to implement Combinational and Sequential logic circuits using logic gates. | 2 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | 2 |
| | CO3 | Analyze the behavior of Combinational and Sequential logic circuits. | 2 | 3 | 2 | 2 | 3 | - | - | - | - | - | - | 2 |
| | CO4 | Adapt effective Communication, presentation and report writing skills. | - | - | - | - | - | - | - | 2 | 2 | 3 | - | 1 |

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|-------------------------------------|--------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 20EE01 Basic Electrical Engineering | CO1 | Illustrate the behavior of active and passive components, series and parallel circuits, self and mutual inductance of magnetic circuits, network functions and two port networks using basic laws in physic and mathematical equations and diagramicatal representations. | 2 | 2 | - | - | - | - | - | - | - | 1 | - | - |
| | CO2 | Interpret the working principles of AC and DC machines along with grounding and earthing using electrical engineering fundamentals and diagramicatal representations. | 2 | 2 | 2 | 1 | - | - | - | - | - | 2 | - | - |
| | CO3 | Apply mesh analysis, nodal analysis and network theorems to solve the Thevnen's voltage, Norton's current and maximum power transfer of the linear circuits. | 3 | 2 | 1 | 2 | - | - | - | - | - | 2 | - | - |

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|--|------------|--|--|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO4 | Analyze the transistor biasing, stabilization and amplification circuits | 3 | 2 | - | - | - | - | - | - | - | - | - | 1 |
| 20EE04 Fundamentals of Electrical Engineering | CO1 | Apply network reduction techniques to simplify electrical circuits | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 1 |
| | CO2 | Analyze the electrical circuits using fundamental laws | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 1 |
| | CO3 | Analyze magnetic circuits | 3 | 2 | - | - | - | - | - | - | - | - | - | 1 |
| | CO4 | Identify a suitable measuring instrument to measure electrical variables | 3 | 2 | - | - | - | - | - | - | - | - | - | 1 |
| | CO5 | Determine the circuit parameters using AC and DC bridges | 3 | 2 | - | - | - | - | - | - | - | - | - | 1 |
| | | CO4 | Analyze the transistor biasing, stabilization and amplification circuits | 3 | 2 | - | - | - | - | - | - | - | - | - |
| 20EE52 Basic Electrical & Electronics | CO1 | Examine electrical circuits using network theorems | 3 | 2 | - | 2 | 2 | - | - | 3 | 3 | 3 | - | 1 |
| | CO2 | Analyze VI characteristics of semiconductor devices. | 3 | 2 | - | 2 | 2 | - | - | 3 | 3 | 3 | - | 1 |
| | CO3 | Analyze electrical circuits | 3 | 2 | - | 2 | 2 | - | - | 3 | 3 | 3 | - | 1 |
| | CO4 | Design Resonance circuits | 3 | 2 | - | 3 | 2 | - | - | 3 | 3 | 3 | - | 1 |
| 20EE53 Electronic circuits | CO1 | Analyze the characteristics of diodes | 3 | 2 | - | - | 2 | - | - | 2 | 2 | 2 | 1 | 1 |
| | CO2 | Examine the performance of rectifiers with filters. | 3 | 2 | - | - | 2 | - | - | 2 | 2 | 2 | 1 | 1 |

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|--|------------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO3 | Analyze the characteristics of BJT and FET. | 3 | 2 | - | - | 2 | - | - | 2 | 2 | 2 | 1 | 1 |
| | CO4 | Design various transistor amplifier circuits. | 3 | 2 | - | - | 2 | - | - | 2 | 2 | 2 | 1 | 1 |
| 20FE01 Professional Communication I | CO1 | Write sentences and paragraphs using proper grammatical structures and word forms. | - | - | - | 2 | - | - | - | - | 3 | 3 | - | 2 |
| | CO2 | Comprehend the given text by employing suitable strategies for skimming and scanning and draw inferences. | - | 1 | - | 2 | - | 1 | - | - | 3 | 3 | - | 2 |
| | CO3 | Write summaries of reading texts using correct tense forms & appropriate structures. | - | - | - | 2 | - | - | - | - | 3 | 3 | - | 2 |
| | CO4 | Write Formal Letters; Memos & E-Mails. | - | 1 | - | 2 | - | 1 | - | - | 3 | 3 | - | 2 |
| | CO5 | Edit the sentences/short texts by identifying basic errors of grammar/vocabulary/syntax. | - | - | - | 2 | - | - | - | - | 3 | 3 | - | 2 |
| 20FE02 Professional | CO1 | Produce a coherent paragraph interpreting a figure / graph/ chart/ table. | - | - | - | 2 | - | - | - | - | 3 | 3 | - | 2 |

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|-----------------------------------|--------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 20FE05 Applied Chemistry | CO1 | Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications. | 3 | 2 | 1 | 2 | - | 2 | 1 | - | - | - | - | 2 |
| | CO2 | Apply principles of corrosion for design and effective maintenance of various equipment. | 3 | 2 | 2 | 1 | - | 2 | 2 | - | - | - | - | 2 |
| | CO3 | Analyse the suitability of advanced materials like nano materials in electronics and medicine. | 3 | 2 | 2 | 1 | - | 2 | 1 | - | - | - | - | 2 |
| | CO4 | Identify the importance of liquid crystals, polymers in advanced technologies. | 3 | 3 | 2 | 1 | - | 2 | 1 | - | - | - | - | 2 |
| | CO5 | Apply the principles of analytical techniques in chemical analysis. | 3 | 2 | 2 | 1 | - | 1 | 1 | - | - | - | - | 2 |
| 20FE51 Professional Communication | CO1 | Introduce oneself and others using appropriate language and details. | - | - | - | - | 3 | - | - | - | - | 3 | 3 | - |
| | CO2 | Comprehend short talks and speak clearly on a specific topic using error free English. | - | - | - | - | 3 | - | - | - | - | 3 | 3 | - |

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|------------------------------|--------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO3 | Acquire practical knowledge related to preparation of polymers. | 2 | | 1 | - | - | - | - | - | - | - | - | - |
| | CO4 | Exhibit skills in performing experiments based on theoretical fundamentals. | 3 | 2 | 1 | - | - | - | - | - | - | - | - | - |
| 20FE08 Engineering Physics | CO1 | Analyse the different mechanical properties of materials. | 3 | 3 | 1 | 1 | - | - | - | - | - | - | - | 1 |
| | CO2 | Apply the lasers and optical fibres in different fields. | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | 1 |
| | CO3 | Summarize the properties of sound waves. | 3 | 3 | 1 | 1 | - | - | - | - | - | - | - | 1 |
| | CO4 | Classify the different types of magnetic and dielectric materials. | 3 | 3 | 1 | 1 | - | - | - | - | - | - | - | 1 |
| | CO5 | Identify the properties of superconducting and nano materials. | 3 | 3 | 1 | 1 | - | - | - | - | - | - | - | 1 |
| 20FE06 Engineering Chemistry | CO1 | Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications. | 3 | 3 | 2 | 1 | - | 2 | 2 | - | - | - | - | 2 |

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|--------------------------------|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO2 | Apply principles of corrosion for design and effective maintenance of various equipment. | 3 | 2 | 2 | 1 | - | 2 | 1 | - | - | - | - | 2 |
| | CO3 | Analyse the suitability of advanced materials like nano materials in electronics and medicine. | 3 | 2 | 2 | 1 | - | 1 | 1 | - | - | - | - | 2 |
| | CO4 | Identify the importance of liquid crystals, polymers in advanced technologies. | 3 | 2 | 2 | 1 | - | 1 | 1 | - | - | - | - | 2 |
| | CO5 | Apply the principles of analytical techniques in chemical analysis. | 3 | 2 | 1 | 1 | - | 1 | 1 | - | - | - | - | 2 |
| 20FE55 Engineering Physics Lab | CO1 | Analyze the wave characteristics of light. | 3 | 2 | 1 | 1 | - | - | - | - | 1 | - | - | 1 |
| | CO2 | Determine the wavelength of laser source and width of slit. | 3 | 2 | 1 | 1 | - | - | - | - | 1 | - | - | 1 |
| | CO3 | Estimate the magnetic field using Stewart's and Gee's apparatus and the rigidity modulus of material using Torsional Pendulum. | 3 | 2 | 1 | 1 | - | - | - | - | 1 | - | - | 1 |
| | CO4 | Identify the phenomena of resonance in strings. | 3 | 2 | 1 | 1 | - | - | - | - | 1 | - | - | 1 |

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|-------------------------------------|--------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO3 | Create web pages using HTML, documents using applications like LaTeX, Google forms and use application software packages: MS-Word, MS-Excel, MS-Power Point to create documents and presentation. | 3 | - | - | - | 3 | - | - | - | - | - | - | - |
| | CO4 | Improve individual / teamwork skills, communication & report writing skills with ethical values. | - | - | - | - | - | - | - | 2 | 2 | 2 | - | - |
| 20IT52 Mathematical Application Lab | CO1 | Identify basic elements of programming structures. | 2 | - | - | - | 2 | - | - | - | - | - | - | - |
| | CO2 | Implement elementary mathematical operations using MATLAB/ SCI Lab or some other open-source tools. | 2 | 1 | - | - | 2 | - | - | - | - | - | - | - |
| | CO3 | Implement the binary operations using MATLAB/ SCI Lab or some other open-source tools. | 2 | 1 | - | - | 2 | - | - | - | - | - | - | - |
| | CO4 | Improve individual / teamwork skills, | - | - | - | - | - | - | - | 2 | 2 | 2 | - | - |

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|-------------------------------------|------------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | | communication & report writing skills with ethical values. | | | | | | | | | | | | |
| 20MC01 Constitution of India | CO1 | Understand history and philosophy of constitution with reference to Preamble, Fundamental Rights and Duties. | - | - | - | - | - | 3 | 3 | 3 | - | 2 | - | 3 |
| | CO2 | Understand the concept of Unitary and Federal Government along with the role of President, Prime Minister and Judicial System | - | - | - | - | - | 3 | 2 | 3 | - | 2 | - | 3 |
| | CO3 | Understand the structure of the state government, Secretariat, Governor and Chief Minister and their functions | - | - | - | - | - | 3 | 3 | 3 | - | 2 | - | 3 |
| | CO4 | Learn local administration viz. Panchayat, Block, Municipality and Corporation. | - | - | - | - | - | 3 | 2 | 3 | - | 2 | - | 3 |
| | CO5 | learn about Election Commission and the process and about SC, ST, OBC and women | - | - | - | - | - | 3 | 3 | 3 | - | 2 | - | 3 |

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|-----------------------------|--------|--|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO3 | Identify the location of centroid / centre of gravity and evaluate the moment of inertia of plane sections/solids. | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 |
| | CO4 | Understand the behaviour of moving bodies in rectilinear motion using kinematic equations or motion curves. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 2 |
| | CO5 | Examine the behaviour of moving bodies using dynamic equilibrium conditions. | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 |
| 20ME51 Engineering Workshop | CO1 | Develop different prototypes in the carpentry section. | 1 | 2 | 1 | 2 | - | 2 | - | - | 3 | 1 | - | 3 |
| | CO2 | Fabricate various basic prototypes in fitting trade | 1 | 2 | 1 | 2 | - | 2 | - | - | 3 | 1 | - | 3 |
| | CO3 | Demonstrate various operations related to plumbing, tin smithy and black smithy | 1 | 2 | 1 | 1 | - | 2 | - | - | 3 | 1 | - | 3 |
| | CO4 | Perform various basic house wiring techniques | 1 | 2 | 1 | 2 | - | 2 | - | - | 3 | 1 | - | 3 |
| 20ME52 Engg | CO1 | Verify the basic laws of mechanics. | 2 | 1 | - | 2 | - | - | - | - | 3 | 2 | - | - |

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|---|--------|---|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| | CO2 | Evaluate the forces in mechanical systems. | 2 | 1 | - | 2 | - | - | - | - | 3 | 2 | - | - |
| | CO3 | Estimate various properties of fuel like viscosity, flash and fire point. | 1 | 1 | - | 2 | - | - | - | - | 3 | 2 | - | - |
| | CO4 | Determine calorific-value of fuels. | 1 | 1 | - | 2 | - | - | - | - | 3 | 2 | - | - |
| 20ME53 Computer Aided Engineering Drawing | CO1 | Understand the Auto-CAD basics and apply to solve practical problems used in industries where the speed and accuracy can be achieved. | - | - | - | - | 3 | - | - | - | - | - | - | 2 |
| | CO2 | Understand the principle of Orthographic projections of points, lines, planes and solids | 2 | - | - | - | 3 | - | - | - | - | - | - | 2 |
| | CO3 | Draw the isometric views of lines, planes and simple solids | 2 | - | - | - | 3 | - | - | - | - | 2 | - | 2 |
| | CO4 | Convert orthographic to isometric vice versa. | 2 | - | - | - | 3 | - | - | - | - | 2 | - | 2 |
| 20ME54-Computer Aided | CO1 | Understand the Auto-CAD basics and apply to solve practical problems used in industries. | - | - | - | - | 3 | - | - | - | - | - | - | 2 |

| Course Name | CO No. | Course Outcomes | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO1 0 | PO1 1 | PO1 2 |
|--------------------|---------------|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
| | CO2 | Draw the Orthographic projections of points, lines, planes and solids. | 2 | - | - | - | 3 | - | - | - | - | - | - | 2 |
| | CO3 | Familiarize (Demonstrate sections of solids and development of surfaces) with the section of solids and development of surfaces. | 2 | - | - | - | 3 | - | - | - | - | 2 | - | 2 |
| | CO4 | Convert orthographic projections to isometric views and vice versa. | 2 | - | - | - | 3 | - | - | - | - | 2 | - | 2 |