LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

Affiliated to JNTUK Kakinada, Approved by AICTE New Delhi,
NAAC Accredited with 'A' grade, Certified by ISO 9001:2015
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R17 UG CO-PO & PSO Mapping

I SEM																
Course Code	17FE01 - PROFESSIONAL COMMUNICATION – I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Use English vocabulary & grammar effectively while speaking and writing. (Apply - L3)	-	-	-	-	-	-	-	-	3	3	-	2	-	-
CO2	Comprehend the given texts and Communicate confidently in formal and informal contexts. (Apply - L3)	-	1	-	2	-	1	-	-	3	3	-	2	-	-
CO3	Draft E-mails& Memos (Apply - L3)	-	-	-	2	-	-	-	-	3	3	-	2	-	-
CO4	Understand the written and spoken information thoroughly. (Understand - L2)	-	1	-	2	-	1	-	-	3	3	-	2	-	-
CO5	Face interviews with confidence. (Apply - L3)	-	-	-	2	-	-	-	-	3	3	-	2	-	-
17FE04	DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply first order and first degree differential equations to find Orthogonal trajectories and to calculate current flow in a simple LCR circuit. (Apply - L3)	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO2	Discriminate among the structure and procedure of solving a higher order differential equations with constant coefficients and variable coefficients.	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO3	Developing continuous functions as an infinite series and compute the Jacobian to determine the functional dependence. (Apply - L3)	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO4	Distinguish among the pros and cons between the Row operation methods and Iterative methods in solving system of linear equations. (Understand - L2)	3	2	-	-	-	-	-	-	-	-	-	1	-	-
CO5	Compute the Eigen values and Eigen vectors and powers, Inverse of a square matrix through Cayley – Hamilton theorem. (Apply - L3)	3	2	-	-	-	-	-	-	-	-	-	1	-	-
17FE13	ENGINEERING PHYSICS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Define the nature of Interference and Diffraction. (Understand - L2)	3	3	2	2	-	-	-	-	-	-	-	2	-	-
CO2	Describe the polarization and LASER, types of lasers and their applications. (Understand - L2)	3	3	3	2	-	-	-	-	-	-	-	2	-	-
CO3	Analyze the dual nature of matter waves and the crystal structures. (Analyze - L4)	3	3	2	2	-	-	-	-	-	-	-	2	-	-
CO4	Identify the different types of magnetic materials and their applications. (Understand - L2)	3	3	2	2	-	-	-	-	-	-	-	2	-	-
CO5	Propose the different superconducting materials. (Understand - L2)	3	3	3	2	-	-	-	-	-	-	-	2	-	-
17CI01	COMPUTER PROGRAMMING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and in view of using them in problem solving. (Understand - L2)	2	3	-	-	-	-	-	-	-	-	-	-	-	2
CO2	Apply various operations on derived data types like arrays and strings in problem solving. (Apply - L3)	2	3	-	-	-	-	-	-	-	-	-	-	-	2
CO3	Design and Implement Modular Programming and memory management using pointers. (Apply - L3)	2	3	2	-	-	-	-	-	-	-	-	-	-	3
CO4	Implement user defined data structures used in specific applications. (Apply - L3)	2	3	2	-	-	-	-	-	-	-	-	-	-	3
CO5	Compare different file I/O operations on text and binary files. (Understand - L2)	2	3	2	-	-	-	-	-	-	-	-	-	2	-
17ME01	ENGINEERING GRAPHICS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Represent the geometrical objects considering BIS standards. (Understand - L2)	2	1	2	-	-	-	-	-	-	-	-	2	2	1
CO2	Comprehend the basics of orthographic projections and deduce orthographic projections of a point and a line at different orientations. (Understand	3	2	2	-	-	-	-	-	-	-	-	2	2	2
CO3	Visualize geometrical planes of different positions in real life environment (Apply - L3)	2	3	2	-	-	-	-	-	-	-	-	2	2	1
CO4	Imagine orthographic views of various solid objects at different orientations (Apply - L3)	2	3	2	-	-	-	-	-	-	-	-	2	2	1
CO5	Recognize the significance of isometric drawing to relate 2D environment with 3D environment. (Understand - L2)	3	3	3	-	-	-	-	-	-	-	-	2	2	2

17FE60	ENGLISH COMMUNICATION SKILLS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Articulate English with good pronunciation. (Apply - L3)	-	-	-	3	-	-	-	-	3	3	-	2	-	-
CO2	Manage skilfully through group discussions. (Apply - L3)	-	-	-	3	-	-	-	-	3	3	-	2	-	-
CO3	Communicate with the people effectively. (Apply - L3)	-	-	-	3	-	-	-	-	3	3	-	2	-	-
CO4	Collect and interpret data aptly.(Apply - L3)	-	-	-	3	-	-	-	-	3	3	-	2	-	-
17FE63	ENGINEERING PHYSICS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the Optical activity in substances like sugar solution. (Understand - L2)	3	3	3	2	-	-	-	-	3	-	-	3	-	-
CO2	Estimate the Radius of curvature of Plano convex lens by forming Newton's rings. (Apply - L3)	3	3	3	2	-	-	-	-	3	-	-	3	-	-
CO3	Determine the frequency of A C using sonometer and resonant frequency in LCR Circuit (Analyze - L4)	3	3	2	2	-	-	-	-	3	-	-	3	-	-
CO4	Analyze the variation of magnetic field with distance along the axis of a current carrying coil.(Analyze - L4)	3	3	2	2	-	-	-	-	3	-	-	3	-	-
17CI60	COMPUTER PROGRAMMING LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply and practice logical formulations to solve some simple problems leading to specific applications. (Apply - L3)	1	2	-	3	2	-	-	-	-	-	2	1	3	1
CO2	Demonstrate C programming development environment, compiling, debugging, linking and executing a program using the development	1	2	-	3	2	-	-	-	-	-	2	1	3	1
CO3	Design effectively the required programming components that efficiently solve computing problems in real world. (Apply - L3)	2	1	-	1	2	-	-	-	-	-	1	1	3	1
17ME60	ENGINEERING WORKSHOP	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Design and model different prototypes in the carpentry trade such as Cross lap joint, Dovetail joint. (Apply - L3)	3	1	1	-	-	-	-	-	-	-	-	1	1	1
CO2	Fabricate and model various basic prototypes in the trade offittingsuchasStraightfit, V-fit. (Apply - L3)	3	1	1	-	-	-	-	-	-	-	-	1	1	1
CO3	Produce various basic prototypes in the trade of Tinsmithy such as rectangular tray, and open Cylinder. (Apply - L3)	3	1	1	-	-	-	-	-	-	-	-	1	1	1
CO4	Perform various basic House Wiring techniques. (Apply - L3)	3	1	1	-	-	-	-	-	-	-	-	1	1	1
	II Sem														
17FE02	**Professional Communication-II**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Use appropriate vocabulary to interpret data thoroughly and to write reports effectively. (Apply - L3)	-	1	-	1	-	1	-	-	3	3	-	2	-	-
CO2	Face any situation with confidence and voice opinions/decisions assertively. (Apply - L3)	-	1	-	1	-	1	-	-	3	3	-	2	-	-
CO3	Use English Language effectively in spoken and written forms. (Apply - L3)	-	1	-	1	-	1	-	-	3	3	-	2	-	-
CO4	Work effectively in teams for better result. (Apply - L3)	-	1	-	1	-	1	-	-	3	3	-	2	-	-
CO5	Communicate effectively using verbal and non-verbal dimensions aptly. (Apply - L3)	-	1	-	1	-	1	-	-	3	3	-	2	-	-
17FE06	**Transformation Techniques and Vector Calculus**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the concepts of Laplace Transforms to solve ordinary differential equations. (Apply - L3)	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO2	Apply Z - Transforms to solve difference equations (Apply - L3)	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO3	Discriminate among Cartesian, Polar and Spherical coordinates in multiple integrals and their respective applications to areas and volumes.	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO4	Evaluate the directional derivative, divergence and angular velocity of a vector function. (Apply - L3)	3	2	-	1	-	-	-	-	-	-	-	1	-	-
CO5	Apply Vector Integration for curves, surfaces and volumes and relationship among themselves. (Apply - L3)	3	2	-	1	-	-	-	-	-	-	-	1	-	-
17FE14	**Applied Chemistry**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify the troubles due to hardness of water and its maintenance in industrial applications. (Understand - L2)	3	3	2	-	-	2	1	-	-	-	-	2	-	-
CO2	Analyze issues related to conventional fuels and apply the concepts of advanced fuels like bio, nuclear and rocket fuels in energy production.	3	2	-	-	-	3	2	-	-	-	-	2	-	-
CO3	Analyze different types of electrodes and batteries for technological applications. (Analyze - L4)	3	3	3	-	-	-	2	-	-	-	-	2	-	-
CO4	Apply principles of corrosion for design and effective maintenance of various equipments. (Apply - L3)	3	2	3	-	-	2	1	-	-	-	-	2	-	-
CO5	Identify the important applications of engineering materials like plastics, rubbers and lubricants. (Understand - L2)	2	2	-	-	-	2	1	-	-	-	-	2	-	-
17EE50	**Basic Electrical and Electronics Engineering**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the electrical circuits (Analyze - L4)	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO2	Illustrate the performance of static and Rotating machines (Understand - L2)	3	2	-	-	-	-	-	-	-	-	-	1	-	-
CO3	Illustrate basic semiconductor devices and logic circuits. (Understand - L2)	3	2	-	-	-	-	-	-	-	-	-	1	-	-
CO4	Interpret the working of various electrical measuring instruments (Understand - L2)	3	-	-	-	-	-	-	-	-	-	-	1	-	-
17ME02	**Engineering Mechanics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Determine the coplanar force systems using free body diagram. (Apply - L3)	3	2	2	1	-	-	-	-	-	-	-	2	2	3
CO2	Analyze the rigid bodies associated with frictional forces using conditions of equilibrium (Apply - L3)	2	3	2	1	-	-	-	-	-	-	-	2	2	3
CO3	Locate the centroid/center of gravity and determine the moment of inertia of plane sections/solids (Apply - L3)	3	2	2	1	-	-	-	-	-	-	-	2	2	3

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	Examine the behaviour of moving bodies in rectilinear and trajectory motion using kinematic equations or motion curves. (Apply - L3)	2	2	2	1	-	-	-	-	-	-	-	2	2	3
CO5	Examine the behaviour of moving bodies using dynamic equilibrium/workenergy methods (Apply - L3)	3	2	2	1	-	-	-	-	-	-	-	2	2	3
17FE64	**Applied Chemistry Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Assess quality of water based on the procedures given. (Understand - L2)	3	3	-	2	-	2	2	-	-	-	-	-	-	-
CO2	Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus. (Understand - L2)	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Acquire practical knowledge related to preparation of polymers. (Apply - L3)	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Exhibit skills in performing experiments based on theoretical fundamentals. (Understand - L2)	2	2	-	-	-	-	-	-	-	-	-	-	-	-
17EE72	**Basic Electrical and Electronics Engineering Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze electrical circuits for both DC and AC excitations (Analyze - L4)	3	2	-	2	2	-	-	-	-	-	-	1	1	1
CO2	Demonstrate the usage of various electrical and electronic components (Understand - L2)	3	-	-	-	-	-	-	-	-	-	-	1	1	1
CO3	Operate BJT under different configurations and explore how it works as an amplifier and switch (Apply - L3)	3	-	-	-	3	-	-	-	-	-	-	1	1	1
17ME61	**Engineering Mechanics and Fuel Testing Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Verify the laws of Mechanics. (Apply - L3)	3	1	1	1	-	-	-	-	-	-	-	2	2	2
CO2	Evaluate the force in the mechanical systems. (Analyze - L4)	3	2	2	1	-	-	-	-	-	-	-	2	2	2
CO3	Estimate the dynamic characteristics of fuel using Viscosity and Flash & Fire point data (Analyze - L4)	3	2	2	1	-	-	-	-	-	-	-	2	2	2
CO4	Determine calorific-value of fuels. (Apply - L3)	3	2	2	1	-	-	-	-	-	-	-	2	2	2
17ME62	**Computer Aided Engineering Graphics Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the Auto-CAD basics and apply to solve practical problems used in industries where the speed and accuracy can be achieved.	3	3	2	-	3	-	-	-	-	-	-	2	3	3
CO2	Understand the principle of Orthographic projections of points, lines, planes and solids. (Understand - L2)	3	3	2	-	3	-	-	-	-	-	-	2	3	2
CO3	Familiarize with the sectioning of solids and development of surfaces.(Understand - L2)	3	3	2	-	3	-	-	-	-	-	-	2	3	2
CO4	Convert orthographic to isometric vice versa. (Apply - L3)	3	3	2	-	3	-	-	-	-	-	-	2	3	2
	III Sem														
17FE07	**Numerical Methods and Fourier Analysis**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Compare the rate of accuracy between various methods in approximating the root of theequation and Distinguish among the criteria ofselection and procedures of various Numerical Integration Rules. (Understand - L2)	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO2	Estimate the best fit polynomial for the given tabulataed data using the methods of Newton's Interpolation formulae and Lagrange's Interpolation.	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO3	Apply various Numerical methods in solving the initial value problem involving the ordinary differential equation. (Apply - L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO4	Estimate the unknown dependent variables using curve fitting methods. (Analyze - L4)	3	2	-	2	-	-	-	-	-	-	-	1	-	-
CO5	Generate the single valued functions in the form of Fourier series and obtain the Fourier Transforms (Apply - L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-
17ME05	**Metallurgy and Material Science**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Estimate the properties of the metals and alloys based on structures (Understand - L2)	2	2	2	1	-	-	-	-	-	-	-	-	3	3
CO2	Classify, construct and analyze equilibrium diagrams (Understand - L2)	3	1	1	1	-	-	-	-	-	-	-	-	3	3
CO3	Distinguish various ferrous, non-ferrous metals and alloys (Understand - L2)	3	3	3	1	-	-	-	-	-	-	-	-	3	3
CO4	Identify the influence of mechanical working and heat treatment principles on materials (Understand - L2)	3	1	1	1	-	-	-	-	-	-	-	-	3	3
CO5	Identify the suitable manufacturing method for composite materials (Understand - L2)	3	2	1	1	-	-	-	-	-	-	-	-	3	3
17AE01	**Engineering Fluid Mechanics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the basic aspects of fluids under static conditions (Understand - L2)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
CO2	Apply differential relations to characterize the behaviour of fluid flow (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Apply the conservation laws to solve elementary fluid flow problems(Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO4	Characterize the fluid flow properties through pipes and pipe network (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO5	Characterize the performance of various hydraulic turbines and pumps (Apply-L3)	2	2	3	3	-	-	-	-	-	-	-	3	3	3
17AE02	**Engineering Thermodynamics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the thermodynamic properties of various systems (Understand-L2)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
CO2	Apply the laws of thermodynamics to analyze various thermal systems (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Analyze the entropy change of various processes. (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO4	Analyze the properties of different gas mixtures and pure substances. (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO5	Analyze ideal gas power cycles and refrigeration cycles to estimate various performance parameters (Analyze-L4)	2	3	3	3	-	-	-	-	-	-	-	3	3	3

17AE03	Strength of Materials	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analysis of stress-strain behaviour in different types of members under various load conditions. (Apply - L3)	3	3	3	2	2	-	-	-	-	-	-	3	3	3
CO2	Evaluate shear force and bending moment of beams under different loading conditions. (Apply-L3)	3	3	3	2	2	-	-	-	-	-	-	3	3	3
CO3	Apply the Theory of Simple bending and Torsion (Apply - L3)	3	3	3	2	2	-	-	-	-	-	-	3	3	3
CO4	Evaluate shear stress distributions over different cross sections.(Apply-L3)	3	3	3	3	2	-	-	-	-	-	-	3	3	3
CO5	Analysis of deflection of statically determinate beams, and stresses due to internal pressure in thin, thick cylindrical shells. (Analyze-L4)	3	3	3	3	2	-	-	-	-	-	-	3	3	3

17AE04	Elements of Aerospace Engineering	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe functions of various external and internal components of an airplane(Understand – L2)	3	2	1	1	-	-	-	-	-	-	-	2	2	2
CO2	Classify the various forces and moments acting on an airfoil(Understand – L2)	3	2	1	1	-	-	-	-	-	-	-	2	2	2
CO3	Describe the working principles of various aircraft engine systems(Understand – L2).	3	2	1	1	-	-	-	-	-	-	-	2	2	2
CO4	Describe the basic aspects of space flight(Understand – L2)	3	2	1	1	-	-	-	-	-	-	-	2	2	2

17AE60	Basic Simulation Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Write the simple executable programs for a given engineering task (Apply-L3)	3	3	3	2	3	-	-	-	-	-	-	2	2	2
CO2	Perform simple debugging techniques (Apply-L3)	2	2	2	2	3	-	-	-	-	-	-	2	2	2
CO3	Make decisions in LabVIEW programming (Apply-L3)	2	2	3	3	3	-	-	-	-	-	-	2	2	2
CO4	Create an executable file with LabVIEW (Apply-L3)	2	2	3	3	3	-	-	-	-	-	-	2	2	2

17ME67	Fluid Mechanics and Hydraulic Machinery Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Evaluate various flow parameters through pipes and flow rate measuring devices (Analyze -L4)	3	3	2	1	-	-	-	-	-	-	-	2	2	2
CO2	Evaluate the performance of hydraulic machines (Analyze -L4)	3	3	2	1	-	-	-	-	-	-	-	2	2	2

17AE61	Strength of Materials Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the behaviour of various structural members under different equilibrium loading conditions(Analyze -L4)	3	3	2	1	-	-	-	-	-	-	-	2	2	2
CO2	Perform tests and analyze various structural members subjected to tension, torsion, bending, and buckling (Analyze -L4)	3	3	2	1	-	-	-	-	-	-	-	2	3	3

17PD03	Professional Ethics and Human Values	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Acquire the basic concepts of human values and also gain the connotations of ethical theories (Understand – L2)	-	-	-	-	-	2	-	3	1	-	-	2	-	3
CO2	Know the basic concepts of professional ethics and handling dilemma in decision making (Understand – L2)	-	-	-	-	-	2	-	3	1	-	-	2	-	3
CO3	Know the duties and rights towards the society in an engineering profession (Understand – L2)	-	-	-	-	-	2	-	3	1	-	-	2	-	3
CO4	Realize the importance and necessity of intellectual property rights (Understand – L2)	-	-	-	-	-	2	-	3	1	-	-	2	-	3
CO5	Take all the necessary precautions while conducting the experiments, which may reduce the risk (Understand – L2)	-	-	-	-	-	2	-	3	1	-	-	2	-	3

IV Sem

17FE03	Environmental Science	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.	-	-	-	-	-	2	-	-	-	-	-	2	-	-
CO2	Evaluate local, regional and global environmental issues related to resources and their sustainable management (Understand – L2)	-	-	-	-	-	2	-	-	-	-	-	2	-	-
CO3	Identify the importance of ecosystem and biodiversity for maintaining ecological balance (Understand – L2)	-	-	-	-	-	2	-	-	-	-	-	2	-	-
CO4	Acknowledge and prevent the problems related to pollution of air, water and soil (Understand – L2)	-	-	-	-	-	2	-	-	-	-	-	2	-	-
CO5	Interpret the significance of implementing environmental laws and abatement devices for environmental management (Understand – L2)	-	-	-	-	-	-	3	-	-	-	-	2	-	-

17FE08	Probability and Statistics	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Predict various probabilistic situations based on the laws of probability and random variables (Understand – L2)	2	2	1	2	-	-	-	-	-	-	-	1	-	-
CO2	Distinguish among the criteria of selection and application of Binomial, Poisson, Normal and Exponential distributions (Understand – L2)	2	2	1	2	-	-	-	-	-	-	-	1	-	-
CO3	Estimate the point and interval estimators of mean and proportion for the given Sample data (Analyze -L4)	2	2	1	2	-	-	-	-	-	-	-	1	-	-
CO4	Apply various sample tests like Z-test, t-test, F-test and $\chi2$-test for decision making regarding the population based on sample data (Apply-L3)	2	2	1	2	-	-	-	-	-	-	-	1	-	-
CO5	Estimate the level of correlation, the linear relationship using the regression lines for the given bivariate data (Apply-L3)	2	2	1	2	-	-	-	-	-	-	-	1	-	-

17AE05	Thermal Engineering	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the working of various components of IC engine (Understand – L2)	3	1	1	1	-	-	-	-	-	-	-	2	2	2
CO2	Formulate the performanc paramaters of air of different air refrigeration systems (Apply – L3)	3	1	1	2	-	-	-	-	-	-	-	2	2	2
CO3	Understand the various properties of moist air and methods to condition the air (Understand – L2)	3	3	3	3	-	-	-	-	-	-	-	2	2	2
CO4	Apply thermodynamic laws to characterize the steam power cycles (Apply – L3)	3	3	3	1	-	-	-	-	-	-	-	2	1	1

17AE06	Manufacturing Technology	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Acquire knowledge of the basic aspects of casting process (Understand – L2)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
CO2	Know the various basic concepts of welding process (Understand – L2)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
CO3	Apply metal forming process and sheet metal operations in the manufacturing of products (Apply-L3)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
CO4	Apply various lathe operations to manufacture products (Apply-L3)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
CO5	Understand different types of machining operations while manufacturing a product (Understand – L2)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
17AE07	**Aerodynamics-I**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply Laplace equation for obtaining 2D and axisymmetric solutions. (Apply-L3)	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO2	Apply conformal transformation to form aerodynamic shapes. (Apply-L3)	3	2	2	3	-	-	-	-	-	-	-	2	3	3
CO3	Apply potential flow theory to determine airfoil characteristics. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO4	Apply Prandtl's lifting line theory to predict finite wing properties (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO5	Analyze the effect of boundary layer on flow over objects. (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
17AE08	**Aircraft Structures-I**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Estimate the stress-strain relations of Elastic members. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO2	Study the behaviour of stresses in statically determinate beams and trusses (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO3	Analysis of statically indeterminate structures under various loading conditions (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO4	Apply the energy principles to identify the energy stored in the structural members (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO5	Analyze the buckling of columns and compressive member under various loading conditions (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
17ME69	**Thermal Engineering Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Estimate various fuel characteristics through experimental testing (Analyze-L4)	3	2	3	1	-	-	-	-	-	-	-	1	2	1
CO2	Analyze the performance characteristics of Internal Combustion Engines (Analyze-L4)	3	2	3	1	-	-	-	-	-	-	-	1	2	1
CO3	Evaluate the performance parameters of refrigeration and air conditioning systems (Analyze-L4)	3	2	3	1	-	-	-	-	-	-	-	1	2	1
CO4	Draw the characteristic curves for the air compressors (Apply-L3)	3	2	3	1	-	-	-	-	-	-	-	1	2	1
17AE62	**Manufacturing Technology lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the basic aspects of moulding and casting using hands on practice (Apply-L3)	3	1	1	1	-	-	-	-	-	-	-	1	2	3
CO2	Fabricate machine components with suitable welding, lathe and other machining operations (Apply-L3)	3	1	1	1	-	-	-	-	-	-	-	1	2	3
CO3	Manufacture plastic components using various plastic processing techniques (Apply-L3)	3	1	1	1	-	-	-	-	-	-	-	1	2	3
17ME66	**Computer Aided Machine Drawing Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Develop and/or comprehend basic conventions needed for machine drawing (Understand – L2)	3	1	3	2	3	-	-	-	-	-	-	2	2	3
CO2	Apply the conventions of machine elements while designing standardized parts (Apply-L3)	3	1	3	2	3	-	-	-	-	-	-	2	2	3
CO3	Apply the ideas and make design calculations correctly (Apply-L3)	3	1	3	2	3	-	-	-	-	-	-	2	2	3
CO4	Draw and Assemble mechanical components using a tool (Apply-L3)	3	1	3	2	3	-	-	-	-	-	-	2	3	3
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17HS01	**Engineering Economics and Accountancy**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Gain capacity of analyzing fundamentals of economics concepts which helps in effective business administration (Understand – L2)	-	-	-	-	-	2	-	3	3	-	3	1	-	1
CO2	Discuss cost-output relationship in business operations (Understand – L2)	-	-	-	-	-	2	-	-	2	-	3	1	-	1
CO3	Analyze the features of market structures and present the pricing policies (Analyze-L4)	-	-	-	-	3	2	-	-	2	-	3	1	-	1
CO4	Identify the types of Business organization of the company and the implementation requirements of each one (Understand – L2)	-	-	-	-	3	2	-	-	2	-	3	1	-	1
CO5	Analyze the financial position of the company with the help of financial statements (Analyze-L4)	-	-	-	-	2	2	-	3	2	-	3	1	-	1
17AE09	**Elements of Heat Transfer**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Formulate heat conduction phenomenon through plane, cylindrical surfaces (Apply- L3)	3	2	2	2	-	-	-	-	-	-	-	2	3	3
CO2	Formulate steady state heat conduction phenomenon in planes walls and cylindrical shells (Apply-L3)	3	2	3	2	-	-	-	-	-	-	-	2	3	3
CO3	Formulate the convective heat transfer phenomenon in both external and internal flows (Apply-L3)	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO4	Understand the thermal radiation concepts (Understand-L2)	3	1	2	2	-	-	-	-	-	-	-	2	3	3
CO5	Apply the heat transfer principles on the working of heat exchangers (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
17AE10	**Aerodynamics-II**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the of compressible fluid flow equations to solve flow problems (Apply-L3)	3	2	2	2	-	-	-	-	-	-	-	3	3	3
CO2	Apply the steady one-dimensional flow principles in designing the nozzles and diffusers (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3

Code	CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO3	Characterize the supersonic flow behaviour over objects (Apply-L3)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
	CO4	Characterize the flow through ducts by considering friction and heat transfer affects (Apply-L3)	3	2	2	3	-	-	-	-	-	-	-	3	3	3
	CO5	Apply compressible flow theory to analyze flow over wings (Apply-L3)	3	2	2	3	-	-	-	-	-	-	-	3	3	3
17AE11		**Propulsion – I**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Comprehend the performance characteristics of various jet engines. (Underastand-L2)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO2	Understand effect of subsonic and supersonic inlets for jet engines. (Underastand-L2)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
	CO3	Make use of velocity triangles and elementary theory of compressors to solve aircraft compressor problems. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO4	Identify the parameters governing the design of combustion chambers. (Underastand-L2)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO5	Estimate the performance of aircraft jet engine turbines. (Apply-L3)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
17AE12		**Aircraft Systems and Instruments**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Identify the various types of controls in the airplane design (Underastand-L2)	3	1	1	1	-	-	-	-	-	-	-	3	2	3
	CO2	Understand the performance of hydraulic and pneumatic systems in the aircraft operation (Underastand-L2)	3	1	1	1	-	-	-	-	-	-	-	3	2	3
	CO3	Analyze the performance of various engine systems of an aircraft (Analyze-L4)	3	1	1	1	-	-	-	-	-	-	-	3	2	3
	CO4	Employ necessary auxiliary systems in the operation of an aircraft (Apply-L3)	3	1	1	1	-	-	-	-	-	-	-	3	2	3
	CO5	Employ various instruments necessary of the aircraft operation (Apply-L3)	3	1	1	1	-	-	-	-	-	-	-	3	2	3
-		**PROGRAM ELECTIVE – I**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE13		**Theory of Machines**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Identify various kinematic linkages of a mechanism and determine their position, velocity and acceleration variation throughout the range of motion	3	3	2	2	-	-	-	-	-	-	-	3	3	3
	CO2	Apply the laws of friction on various components of power transmission systems (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
	CO3	Develop gear profiles, gear trains and cam profiles to produce a desired motion (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
	CO4	Determine the effect of gyroscopic pression on moving vehicles. (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
	CO5	Comprehend various principles involved in balancing of rotating and reciprocating masses in a mechanism. (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
17ME22		**CAD/CAM**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Comprehend the principles of CAD/CAM for design and manufacturing (Underastand-L2)	3	2	2	2	2	-	-	-	-	-	-	1	1	3
	CO2	Formulate mathematical equations for geometrical entities like curves, surface, and solids (Apply-L3)	3	3	3	2	2	-	-	-	-	-	-	1	1	3
	CO3	Program for part profiles to accomplish numerical control machining (Apply-L3)	3	3	3	2	3	-	-	-	-	-	-	1	1	3
	CO4	Develop a pseudo codes for different parts using GT codes and apply in automated manufacturing systems (Apply-L3)	3	3	3	3	3	-	-	-	-	-	-	1	1	3
	CO5	Become cognizant about CAQC techniques that are to be applied in manufacturing industry and able to comprehend the applications of Computer Integrated Manufacturing (Underastand-L2)	3	3	3	3	3	-	-	-	-	-	-	1	1	3
17AE14		**Non-Destructive Testing**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Describe the working principles of non-destructive techniques and standard sample specifications (Underastand-L2)	3	2	1	3	3	-	-	-	-	-	-	2	1	3
	CO2	Identify and apply the suitable non-destructive techniques to detect the defects in any component (Underastand-L2)	3	2	1	3	3	-	-	-	-	-	-	2	1	3
	CO3	Describe the various safety measures while performing inspections (Underastand-L2)	3	2	1	3	3	-	-	-	-	-	-	2	1	3
	CO4	Apply special techniques to detect the defects in any component (Apply-L3)	3	3	1	3	3	-	-	-	-	-	-	2	1	3
17AE15		**UAV System Design**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Understand the basic needs to design UAV and MAV (Underastand-L2)	3	1	1	-	-	3	-	-	-	-	-	3	3	3
	CO2	Acquire the knowledge and importance of payload integration with UAV airframe (Underastand-L2)	3	1	1	-	-	2	-	-	-	-	-	3	3	3
	CO3	Understand the advanced concept of UAV and MAV system design to the engineers (Underastand-L2)	3	1	1	-	-	2	-	-	-	-	-	3	3	3
	CO4	Analyze the Performance of UAVs and MAVs subsystems for stable fly (Analyze-L4)	3	2	3	-	-	3	-	-	-	-	-	3	3	3
17AE90		**Aerospace Materials (*Add on course – I)**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Identify the materials suitable for various aircraft components (Underastand-L2)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
	CO2	Identify the types of defects in aircraft components (Underastand-L2)	3	2	2	2	-	-	-	-	-	-	-	1	3	3
	CO3	Characterize various materials used in aircraft (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	1	3	3
	CO4	Describe the mechanical behaviours of composite materials used in aircrafts (Underastand-L2)	3	1	2	2	-	-	-	-	-	-	-	1	3	3
17FE61		**Presentation Skills Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Make power point presentations and oral presentations (Apply - L3)	-	-	-	2	2	2	-	-	3	3	-	2	-	-
	CO2	Use standard vocabulary contextually (Apply - L3)	-	-	-	2	2	2	-	-	3	3	-	2	-	-
	CO3	Manage skilfully through group discussion (Apply - L3)	-	-	-	2	-	2	-	-	3	3	-	2	-	-

Code	Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO4	Negotiate skilfully for better placement (Apply - L3)	-	-	-	2	-	2	-	-	3	3	-	2	-	-
17ME71	**Heat Transfer Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Estimate the thermal conductivity of different materials and powders (Analyze-L4)	3	3	1	3	-	-	-	-	-	-	-	2	2	2
CO2	Estimate the heat transfer coefficient for free and forced convection (Analyze-L4)	3	3	2	2	-	-	-	-	-	-	-	2	2	2
CO3	Validate the Stefan Boltzmann Constant and estimate emissivity of grey body (Apply-L3)	3	3	1	2	-	-	-	-	-	-	-	2	2	2
CO4	Compare parallel and counter flow heat exchanger performance characteristics (Apply - L3)	3	3	2	3	-	-	-	-	-	-	-	2	2	2
17AE63	**Aerodynamics Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the flow characteristics over aerodynamic bodies (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	Analyze flow characteristics through nozzle (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
17PD07	**Seminar**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Collect the required information and prepare a report on a topic of domain specific (Apply - L3)	-	-	-	-	2	2	-	3	-	3	-	3	-	3
CO2	Make oral presentations and participation in discussions on a topic of domain specific (Apply - L3)	-	-	-	-	3	2	-	-	3	-	-	3	-	3
17PD05	**Employability Enhancement Skills-I**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply Quantitative techniques and logical thinking to qualify in recruitment tests and other professional tasks (Apply - L3)	-	2	1	1	-	2	-	-	-	-	-	2	-	2
CO2	Communicate effectively in various professional and social contexts (Apply - L3)	-	2	2	2	-	1	-	-	-	-	-	2	-	2
CO3	Apply Verbal skills effectively in Job Interviews as well other professional contexts (Apply - L3)	-	2	2	2	-	2	-	-	-	-	-	2	-	2
CO4	Demonstrate various principles involved in Quantitative problem solving, thereby reducing the time taken for performing job functions (Apply - L3)	-	3	2	2	-	1	-	-	-	-	-	2	-	2
CO5	Practice life-long learning through personal effectiveness as well as leadership (Apply -L3)	-	2	2	2	-	1	-	-	-	-	-	3	-	2
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17AE16	**Propulsion –II**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate the working principles of ramjet and scram jet engine. (Understand – L2)	3	3	3	2	-	-	-	-	-	-	-	3	2	3
CO2	Comprehend the preliminary concepts of rocket propulsion (Understand – L2)	3	3	2	1	-	-	-	-	-	-	-	2	2	3
CO3	Describe the working of various liquid propellant rocket systems (Understand – L2)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO4	Access the use of solid propellant rocket systems (Apply-L4)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO5	Apply the advanced rocket propulsion techniques for a mission (Apply - L3)	3	3	3	1	-	-	-	-	-	-	-	3	3	3
17AE17	**Aircraft Structures – II**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Assess the behaviour of beam structures subjected to different loading conditions (Apply-L3)	3	2	2	2	-	-	-	-	-	-	-	2	2	3
CO2	Estimate the shear flow distribution and location of shear centre for open sections (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	2	2	3
CO3	Determine the shear flow distribution and location of shear centre in closed section beams (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO4	Formulate the relations for thin plates subjected to bending and buckling loads (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	Analyze the behaviour of bending and shear flow over aircraft wing and fuselage cross-sections (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
17AE18	**Flight Dynamics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Determine thrust and power requirement conditions for steady level flight (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	3	3	2
CO2	Estimate performance parameters of flight during manoeuvring (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Apply the conditions of static stability and control in the aircraft design (Apply-L3)	3	2	3	3	-	-	-	-	-	-	-	3	3	3
CO4	Understand various concepts and conditions of static stability and control (Understand -L2)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	Apply the concepts and conditions of dynamic control methods during flight (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	2
17AE19	**Finite Element Methods in Engineering**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify mathematical model for solution of common engineering problems (Apply-L3)	3	3	2	1	-	-	-	-	-	-	-	2	3	3
CO2	Determine the design quantities (deformation, strain, stress) for engineering structures under different loading conditions. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Solve heat transfer problems using FEM approaches (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO4	Formulate solutions for existing problems using FEM approaches. (Apply-L3)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
CO5	Evaluate the natural frequencies of bar and beam structures (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
-	**PROGRAM ELECTIVE – II**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE20	**Aerodynamics of Missiles and Launch Vehicles**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the forces acting on rockets and missile (Understand-L2)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO2	Identify the aerodynamic properties of slender and blunt bodies (Understand-L2)	3	3	3	2	-	-	-	-	-	-	-	3	3	3

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO3	Apply the hypersonic flow characteristics in designing the flight vehicles (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO4	Understand the aerodynamics aspects of launching phase (Understand-L2)	3	2	2	2	-	-	-	-	-	-	-	3	3	3
CO5	To identify the problems during the launching (Understand-L2)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
17AE21	**Combustion in Aerospace Vehicles**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the basic working of propulsion unit (Understand-L2)	3	3	1	1	-	-	-	-	-	-	-	2	3	2
CO2	Analyze the various factors effecting the combustion process in aircraft engines-piston and jet engines (Analyze-L4)	3	3	2	2	-	-	-	-	-	-	-	2	3	3
CO3	Analyze the various combustion models of rocket engines (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	2
CO4	Understand the reaction and mixing process in supersonic combustion (Understand-L2)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
17AE22	**Experimental Stress Analysis**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Formulate equations of stress under equilibrium conditions (Apply -L3)	3	3	2	1	-	-	-	-	-	-	-	3	3	2
CO2	Apply the strain gage system for strain measurement on bodies acted upon forces (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	2
CO3	Apply and analyze the moiré fringe method in a stress field (Apply-L3)	3	3	2	1	-	-	-	-	-	-	-	3	3	2
CO4	Analyze the fringe pattern of materials using polariscope (Analyze-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	2
17AE23	**Space Mechanics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand basic aspects of space (Understand-L2)	3	3	1	1	-	-	-	-	-	-	-	2	2	3
CO2	Evaluate trajectory details of ballistic missiles (Apply -L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO3	Apply N-body aspects in space exploration issues (Apply -L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO4	Know the general aspects of satellite injections and orbit perturbations (Understand-L2)	3	3	1	1	-	-	-	-	-	-	-	2	3	3
CO5	Understand the interplanetary trajectories of spacecraft (Understand-L2)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
-	**OPEN ELECTIVE – I**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE91	**Industrial Aerodynamics(*Add on course – II)**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Characterize the effects of aerodynamics in automobiles(Understand-L2)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO2	Compute the aerodynamics effects on wind turbines, buildings and its ventilation (Understand-L2)	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO3	Understand the effects of wind and flow induced vibrations over objects (Understand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO4	Apply the effects of aerodynamics in flapping wing vehicles (Apply -L3)	3	2	2	2	-	-	-	-	-	-	-	2	3	3
17AE64	**Propulsion Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the performance of various jet engines components (Analyze-L4)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
CO2	Analyze the performance of piston engine components (Analyze-L4)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
17AE65	**Aircraft Structures Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze beam structures subjected to different loading conditions (Analyze-L4)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
CO2	Analyze deflection based on different theories of aircraft structure (Analyze-L4)	2	3	2	3	-	-	-	-	-	-	-	3	3	3
CO3	Analyze the performance of cams, governors and gyroscope (Analyze-L4)	2	3	2	3	-	-	-	-	-	-	-	3	3	3
17PD04	**Mini Project**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the basic domain specific engineering concepts (Apply -L3)	3	3	2	-	3	-	-	3	3	2	3	3	3	3
CO2	Demonstrate the basic domain specific engineering concepts through working models (Apply -L3)	3	3	2	-	3	-	-	3	3	3	3	3	3	3
	VII Sem														
17AE24	**Mechanics of Composites**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the stress-strain relations applicable for composite materials (Understanding-L2)	3	3	3	2	-	-	-	-	-	-	-	2	2	2
CO2	Study the macro and micro mechanical behaviour of composite Lamina (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	2
CO3	Analyze the structural behaviour of multi directional composites (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	2	3	2
CO4	Understand the basic design concept of sandwich panels used in aerospace industries (Understanding-L2)	3	3	3	2	-	-	-	-	-	-	-	2	3	2
CO5	Apply techniques of fabrication processes to manufacture composites (Apply-L3)	2	2	2	2	-	-	-	-	-	-	-	2	2	2
17AE25	**Computational Fluid Dynamics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Formulate the basic fluid dynamics problem mathematically (Apply-L3)	3	2	2	2	1	-	-	-	-	-	-	2	3	3
CO2	Analyze the mathematical behaviour of partial differential equations (Analyze-L4)	3	3	2	2	1	-	-	-	-	-	-	2	3	3
CO3	Apply the grid generation principles for different problems (Apply-L3)	3	2	3	2	3	-	-	-	-	-	-	2	3	3
CO4	Solve elementary incompressible fluid problems using the CFD techniques (Apply-L3)	3	2	2	2	3	-	-	-	-	-	-	2	3	3

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO5	Solve the elementary heat transfer problems using the CFD techniques (Apply-L3)	3	2	2	2	3	-	-	-	-	-	-	2	3	3
17AE26	**Instrumentation, Measurements and Experiments in Fluids**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Employ the wind tunnels for aerodynamic testing of bodies. (Apply-L3)	3	2	2	2	3	-	-	-	-	-	-	2	3	3
CO2	Adopt and use a visualization technique to understand the flow field. (Underastand-L2)	3	3	2	3	3	-	-	-	-	-	-	2	3	3
CO3	Employ the suitable instrument to measure the velocity, temperature and pressure of fluid flow. (Apply-L3)	3	3	3	3	3	-	-	-	-	-	-	2	3	3
CO4	Acquire experimental data and to estimate the uncertainty in measured values during experimentation. (Apply-L3)	3	3	3	3	3	-	-	-	-	-	-	2	3	3
-	**PROGRAM ELECTIVE - III**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE27	**Applied Gas Dynamics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the concept of continuum, compressibility, gas flow thermodynamics and mechanics. (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	2	3	3
CO2	Evaluate the flow properties variation across a shock wave and expansion fan (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Analyze the CD nozzle, supersonic inlet, supersonic wind tunnel and etc.(Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO4	Solve numerical problems related to the flow with friction, and flow with heat transfer (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO5	Increase the performance of an aircraft during transonic and supersonic speeds (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
17AE28	**Introduction to Space Technology**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the concepts of launching satellites in space (Underastand-L2)	**3**	**1**	**1**	**1**	-	-	-	-	-	-	-	**2**	**3**	**3**
CO2	Apply the principles of orbital mechanics on motion of bodies in orbits (Apply-L3)	**3**	**3**	**3**	**2**	-	-	-	-	-	-	-	**2**	**3**	**3**
CO3	Comprehend the trajectories of rockets and missiles (Underastand-L2)	**3**	**3**	**3**	**2**	-	-	-	-	-	-	-	**2**	**3**	**3**
CO4	Describe the dynamics of spacecraft attitude(Underastand-L2)	**3**	**3**	**3**	**2**	-	-	-	-	-	-	-	**2**	**2**	**3**
17AE29	**Theory of Elasticity**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the equations of compatibility by using plane stress and plane strain conditions. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO2	Apply Saint Venant's principles to determine the displacements of simple beams (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Analyze the stresses and strains in 3-Dimensional problems (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO4	Solve the linear elasticity problems using various analytical techniques (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO5	Analyze the vectors and tensors to enhance the theory of elasticity where ever necessary (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
17AE30	**Introduction to Smart Structures**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the behaviour of smart materials such as piezoelectric ceramics, shape memory alloys and electroactive polymers (Analyze-L4)	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	**2**	**3**	**3**
CO2	Apply smart materials in Aerospace vehicles (Apply-L3)	**3**	**3**	**2**	**2**	-	-	-	-	-	-	-	**3**	**3**	**3**
CO3	Analyze properties of shape memory alloy smart materials (Analyze-L4)	**3**	**3**	**3**	**2**	-	-	-	-	-	-	-	**3**	**3**	**3**
-	**PROGRAM ELECTIVE – IV**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE31	**Hypersonic Aerodynamics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the hypersonic flow theories to analyze flow over bodies (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	Analyze the inviscid and viscous effect of hypersonic flow (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO3	Analyse the viscous interactions in hypersonic flow (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO4	Analyse the effect of high temperature on gas dynamics (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
17AE32	**Propellant Technology**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the characteristics of aircraft fuels (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO2	Comprehend the characteristics of solid propellants used in rockets (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO3	Characterize the properties of liquid propellants used in rockets (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO4	Understand the properties of cryogenic propellants (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO5	Test the propellants to estimates their characteristics (Apply-L3)	3	3	2	1	-	-	-	-	-	-	-	3	3	3
17AE33	**Theory of Vibrations**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Formulate mathematical models for mechanical systems using mass, spring and dampers (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	Analyze a systems with damped free vibrations single degree of freedom (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO3	Develop a single degree of freedom forced vibrating mechanical system under various types of excitation conditions (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO4	Analyze and modify two degree of freedom mechanical systems (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO5	Analyze a systems of multi degrees of freedom (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
17AE34	**Fatigue and Fracture Mechanics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Predict material failure for any combination of applied stresses (Apply-L3)	3	2	2	2	-	-	-	-	-	-	-	2	3	3

Code/CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO2	Estimate failure conditions of a structure (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO3	Determine the stress intensity factor for simple components of simple geometry (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	2	3	3
CO4	Understand the failure of materials due to high temperatures (Underastand-L2)	3	3	1	1	-	-	-	-	-	-	-	2	3	3
-	**OPEN ELECTIVE– II**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE80	**Principles of Flight**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe functions of various external and internal components of an airplane (Underastand-L2)	3	3	1	1	-	-	-	-	-	-	-	2	-	-
CO2	Understand the basic aspects of aerodynamics, aircraft propulsion systems and aircraft structural components (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	-	-
CO3	Formulate basic performance parameters of an aircraft (Underastand-L2)	3	3	3	2	-	-	-	-	-	-	-	3	-	-
CO4	Describe the stability and control aspects of flight (Underastand-L2)	3	3	3	2	-	-	-	-	-	-	-	3	-	-
17EC80	**Satellite Technology**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify various applications of satellites, launch vehicles and basic functions of satellite system (Underastand-L2)	3	2	1	1	-	-	-	-	-	-	-	1	3	3
CO2	Understand components, characteristics of a power subsystem and various aspects of spacecraft control (Underastand-L2)	3	2	2	2	-	-	-	-	-	-	-	2	3	3
CO3	Evaluate the orbital model, parameters related to satellites and the requirements needed for the selection an earth station (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	3
CO4	Analyze the satellite structures, internal and external design issues of a spacecraft (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	2	3	3
17AE92	**Airport Design (*Add on course – III)**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Acquire the concept of air traffic rules and clearance procedures for airline operation (Underastand-L2)	3	2	2	-	-	-	-	-	-	-	-	2	3	3
CO2	Apply air traffic data for air traffic services (Apply-L3)	3	3	2	-	-	-	-	-	-	-	-	3	3	3
CO3	Comprehend the aerodrome design factors for service establishments (Underastand-L2)	3	3	2	-	-	-	-	-	-	-	-	3	3	3
17AE66	**Aircraft ComponentModeling and Analysis Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Draw aircraft components in 2D and 3D geometric modeling (Apply-L3)	3	2	3	2	3	-	-	-	-	-	-	2	3	3
CO2	Solve and analyze the structural components of aircraft for deformations and stresses using a numerical tool. (Analyze-L4)	3	3	3	3	3	-	-	-	-	-	-	3	3	3
17AE67	**Aircraft Design Lab**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Design an aircraft system, component, or process as per the requirement (Apply-L3)	3	3	3	2	3	-	-	-	-	-	-	2	3	3
CO2	Design an aircraft as per the assigned specifications (Apply-L3)	3	3	3	3	3	-	-	-	-	-	-	3	3	3
17PD09	**Internship**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Work in real time situations in industries through hands on job execution (Apply-L3)	3	3	3	3	3	2	-	3	3	3	2	3	3	3
CO2	Apply theoretical aspects to solve engineering problems in the industries (Apply-L3)	3	3	3	2	3	2	-	1	3	3	2	3	3	3
	VIII Sem														
-	**PROGRAM ELECTIVE – V**	-	-	-	-	-	-	-	-	-	-	6	-	-	-
17AE35	**Helicopter Engineering**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the performance of various components of helicopter (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO2	Apply momentum theory in the design of propeller (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO3	Characterize the performance of helicopter under various operating conditions (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
CO4	Describe different stability modes of helicopter (Underastand-L2)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
17AE36	**Wind Engineering**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe about the properties of Atmosphere, atmospheric motions, local winds and different types of Terrains. (Underastand-L2)	3	2	1	2	-	-	-	-	-	-	-	2	3	3
CO2	Interpret the Atmospheric Boundary Layer Equations including turbulence profiles, Power spectral Densities, length scales and roughness parameters. (Underastand-L2)	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO3	Apply atmospheric boundary layer equations on bluff bodies to study time varying forces, wake regions, flow separations and reattachment regions. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	2	3	3
CO4	Analyze wind loading characteristics using various assessment methods like Quasi-Steady method, Peak factor method and Extreme value method. (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO5	Predict the Aeroelastic phenomena of various bluff bodies like circular cables, tall structures and Launch vehicles. (Underastand-L2)	3	3	3	2	-	-	-	-	-	-	-	2	3	3
17AE37	**Cryogenics**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the properties of cryogenic fuels (Underastand-L2)	3	3	2	1	-	-	-	-	-	-	-	1	2	2
CO2	Demonstrate the various liquefaction systems (Underastand-L2)	3	2	3	2	-	-	-	-	-	-	-	3	3	3
CO3	Describe the purification and cryogenic storage process. (Underastand-L2)	3	3	2	1	-	-	-	-	-	-	-	1	2	2
17AE38	**Aero Elasticity**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

Code	CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Analyze the effects of vortex induced vibration on components of an aircraft (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	3
	CO2	Analyze the aircraft components by considering effects of flow induced vibration (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO3	Analyse aeroelastic phenomena in aerospace vehicles (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	3
	CO4	Estimate the flutter velocity using various methods (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	3
-		**PROGRAM ELECTIVE -VI**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE39		**Boundary Layer Theory**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Formulate fundamental equations of viscous flow (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
	CO2	Apply the viscous flow equations to solve fluid flow problems (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	3	3	3
	CO3	Analyze laminar and turbulent boundary layer flow fields of objects (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
	CO4	Describe the properties of compressible boundary layer flow (Underastand-L2)	3	3	2	1	-	-	-	-	-	-	-	3	3	3
17AE40		**Advanced Propulsion Systems**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Comprehend the scram jet engine performance. (Underastand-L2)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO2	Understand the performance nuclear prolusion systems (Underastand-L2)	3	3	2	3	-	-	-	-	-	-	-	3	3	3
	CO3	Apply the electric propulsion for space applications. (Apply-L3)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO4	Understand the various micro propulsion systems. (Underastand-L2)	3	3	2	1	-	-	-	-	-	-	-	2	3	3
	CO5	Understand the various advanced chemical propulsion systems. (Underastand-L2)	3	3	2	1	-	-	-	-	-	-	-	2	3	3
17AE41		**Theory of Plates and Shells**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Apply the classical lamination plate theory in engineering structures (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	1	3	2
	CO2	Analyze the stability of rectangular plates under various loading conditions (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	2
	CO3	Apply the various approximation techniques to evaluate the problems. (Apply-L3)	3	3	2	2	-	-	-	-	-	-	-	2	3	2
	CO4	Analyze the circular cylindrical shells under various loading conditions (Apply-L3)	3	3	3	2	-	-	-	-	-	-	-	2	3	2
17AE42		**Aero Engine Repair and Maintenance**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Classify the piston engine components (Underastand-L2)	3	2	2	1	-	-	-	-	-	-	-	3	3	3
	CO2	Inspect and troubleshoot the piston engines components (Underastand-L2)	3	2	2	1	-	-	-	-	-	-	-	2	3	3
	CO3	Illustrate the piston engine testing procedures (Underastand-L2)	3	3	2	1	-	-	-	-	-	-	-	2	3	3
	CO4	Describe the inspection procedure of jet engine components (Underastand-L2)	3	3	3	1	-	-	-	-	-	-	-	3	3	3
	CO5	Prepare overhaul procedures for jet engine components (Understand-L2)	3	2	2	1	-	-	-	-	-	-	-	3	3	3
-		**OPEN ELECTIVE– III**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17AE81		**Space Technology**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Understand the concepts of launching satellites in space (Underastand-L2)	3	2	2	2	-	-	-	-	-	-	-	2	3	3
	CO2	Analyze the orbital elements and its maneuvering (Analyze-L4)	3	3	3	2	-	-	-	-	-	-	-	3	3	3
	CO3	Analyze the trajectories of rockets and missiles (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
	CO4	Analyze the dynamics of spacecraft attitude (Analyze-L4)	3	3	3	3	-	-	-	-	-	-	-	3	3	3
17PD11		**Project Work**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Apply domain specific concepts to solve real time problems (Apply-L3)	3	3	3	3	3	-	-	-	-	-	3	3	3	3
	CO2	Prepare a technical report with required analysis (Analyze-L4)	3	3	3	2	3	-	-	3	3	3	3	3	3	3
	CO3	Work in teams with professional and ethical values. (Apply-L3)	3	-	-	-	-	-	-	3	3	3	3	3	3	3
17PD12		**Comprehensive Viva-Voce**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	Demonstrate various concepts of engineering during interview sessions (Underastand-L2)	3	3	-	-	-	-	-	-	3	3	-	2	3	3
	CO2	Explore various methodologies to comprehend a particular concept (Apply-L3)	3	3	-	-	-	-	-	-	3	3	-	2	3	3