Correlations: Substantial (High) -3, Moderately (Medium) -2, Slight (Low)-1

DEPARTMENT OF MECHANICAL ENGINEERING																
COURSE OUTCOMES AND ARTICULATION MATRIX													Regulations (R20)			
I SEMESTER(I BTECH -I SEM)																
20FE01	**Professional Communication-I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Write sentences and paragraphs using proper grammatical structures and word forms (Remember – L1)	-	-	-	2	-	-	-	-	3	3	-	2	-	-	-
CO 2	Comprehend the given text by employing suitable strategies for skimming and scanning and draw inferences (Understand – L2)	-	1	-	2	-	1	-	-	3	3	-	2	-	-	-
CO 3	Write summaries of reading texts using correct tense forms & appropriate structures (Remember – L1)	-	-	-	2	-	-	-	-	3	3	-	2	-	-	-
CO 4	Write Formal Letters; Memos & E-Mails (Apply – L3)	-	1	-	2	-	1	-	-	3	3	-	2	-	-	-
CO 5	Edit the sentences/short texts by identifying basic errors of grammar/vocabulary/syntax (Understand – L2)	-	-	-	2	-	-	-	-	3	3	-	2	-	-	-
	Average		**1.00**	**-**	**2.00**	**-**	**1.00**	**-**	**-**	**3.00**	**3.00**	**-**	**2.00**	**-**	**-**	**-**
20FE03	**Differential Equations**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO 1	Apply first order and first-degree differential equations to find orthogonal trajectories (Apply – L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
CO 2	Distinguish between the structure and methodology of solving higher order differential equations with constant coefficients (Understand – L2)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
CO 3	Apply various Numerical methods to solve initial value problem (Apply – L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
CO 4	Generate the infinite series for continuous functions and investigate the functional Dependence (Understand – L2)	2	1	-	1	-	-	-	-	-	-	-	1	-	-	-
CO 5	Solve partial differential equations using Lagrange's method (Apply – L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
	Average	**2.80**	**1.80**	**-**	**1.80**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**-**	**-**
20FE05	**Applied Chemistry**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Identify the troubles due to hardness of water and its maintenance in industrial applications. (Understand - L2)	3	2	1	2	-	2	1	-	-	-	-	2	-	-	-
CO 2	Understand the issues related to conventional fuels, biofuels and photo-voltaic cells in energy production. (Understand - L2)	3	2	2	1	-	2	2	-	-	-	-	2	-	-	-
CO 3	Apply Nernst Equation for calculating electrode cell potentials and compare batteries for different applications. (Apply - L3)	3	2	2	1	-	2	1	-	-	-	-	2	-	-	-
CO 4	Apply principles of corrosion for design and effective maintenance of various equipment. (Apply - L3)	3	3	2	1	-	2	1	-	-	-	-	2	-	-	-
CO 5	Analyse the suitability of engineering materials like polymers, lubricants, nano materials and	3	2	2	1	-	1	1	-	-	-	-	2	-	-	-

	composites in technological applications. (Understand – L2)															
	Average	**3.00**	**2.20**	**1.80**	**1.20**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**-**	**-**	**-**
20ME01	**Engineering Graphics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Identify the geometrical objects considering BIS standards. (Remember-L1)	2	3	1	1	1	-	-	3	1	1	-	2	1	1	1
CO 2	Comprehend the basics of orthographic projections and deduce orthographic projections of a point and a line at different orientations. (Understand-L2)	3	3	1	2	1	-	-	1	1	1	-	2	2	2	2
CO 3	Represent graphically the geometrical planes at different positions and orientations. (Understand-L2)	2	3	1	2	1	-	-	1	2	1	-	2	2	2	2
CO 4	Analyse and draw solid objects at different positions and orientations. (Apply- L3)	2	3	1	2	1	-	-	1	2	1	-	2	3	3	3
CO 5	: Visualize isometric and orthographic views of geometrical objects and convert one form to another. (Understand-L2)	3	3	3	3	2	2	-	2	2	1	-	2	-	-	-
	Average	**2.40**	**3.00**	**1.40**	**2.00**	**1.20**	**2.00**	**-**	**1.60**	**1.60**	**1.00**	**-**	**2.00**	**2.00**	**2.00**	**2.00**
20EE02	**Basic Electrical and Electronics Engineering**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Apply network reduction techniques to simplify electrical circuits. (Apply-L3)	3	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO 2	Illustrate the working principle of DC machines and transformers. (Understand-L2)	3	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO 3	Understand V-I characteristics of semiconductor devices. (Understand-L2)	3	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO 4	Illustrate the configuration of Transistors and their applications. (Understand-L2)	3	2	-	-	-	-	-	-	-	-	-	1	-	-	-
	Average	**3.00**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**-**	**-**
20FE52	**Applied Chemistry Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO 1	Assess quality of water based on the procedures given. (Understand - L2)	3	3	-	1	-	2	2	-	-	-	-	-	-	-	-
CO 2	Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus. (Understand - L2)	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO 3	Acquire practical knowledge related to preparation of polymers. (Understand - L2)	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO 4	Exhibit skills in performing experiments based on theoretical fundamentals. (Understand - L2)	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	Average	**2.50**	**2.00**	**1.00**	**1.00**	**-**	**2.00**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
20EE52	**Basic Electrical and Electronics Engineering Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Examine electrical circuits using network theorems. (Apply-L3)	3	2	-	2	2	-	-	3	3	3	-	1	-	-	-
CO 2	Analyze VI characteristics of semiconductor devices. (Understand-L2)	3	2	-	2	2	-	-	3	3	3	-	1	-	-	-
CO 3	Analyze electrical circuits. (Understand-L2)	3	2	-	2	2	-	-	3	3	3	-	1	-	-	-
CO 4	Design Resonance circuits. (Apply-L3)	3	2	-	3	2	-	-	3	3	3	-	1	-	-	-
	Average	**3.00**	**2.00**	**-**	**2.25**	**2.00**	**-**	**-**	**3.00**	**3.00**	**3.00**	**-**	**1.00**	**-**	**-**	**-**
20ME51	**Engineering Workshop**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Develop different prototypes in the carpentry section. (Understand-L2)	1	2	1	2	-	2	-	-	3	1	-	3	-	3	2
CO 2	Fabricate various basic prototypes in fitting trade. (Understand-L2)	1	2	1	2	-	2	-	-	3	1	-	3	-	3	2
CO 3	Demonstrate various operations related to plumbing, tin smithy and black smithy. (Understand-L2)	1	2	1	1	-	2	-	-	3	1	-	3	-	3	2

CO 4	Perform various basic house wiring techniques. (Apply-L3)	1	2	1	2	-	2	-	-	3	1	-	3	-	3	2
	Average	1.00	2.00	1.00	1.75		2.00	-	-	3.00	1.00	-	3.00	-	3.00	2.00
II SEMESTER(I BTECH -II SEM)																
20FE02	**Professional Communication-II**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Produce a coherent paragraph interpreting a figure/graph/chart/table (Understand – L2)	-	-	-	2	-	-	-	-	3	3	-	2	-	-	-
CO 2	Comprehend the given texts thoroughly by guessing the meanings of the words contextually (Understand – L2)	-	1	-	2	-	1	-	-	3	3	-	2	-	-	-
CO 3	Use language appropriately for describing/comparing/contrasting/giving directions & suggestions (Remember – L1)	-	-	-	2	-	-	-	-	3	3	-	2	-	-	-
CO 4	Write formal/informal dialogues with an understanding of verbal/non-verbal features of communication. Guess meanings of the words from the context (Understand – L2)	-	1	-	2	-	1	-	-	3	3	-	2	-	-	-
CO 5	Write well-structured essays; Reports & Résumé (Apply – L3)	-	1	-	2	-	1	-	-	3	3	-	2	-	-	-
	Average	**-**	**1.00**	**-**	**2.00**	**-**	**1.00**	**-**	**-**	**3.00**	**3.00**	**-**	**2.00**	**-**	**-**	**-**
20FE04	**Linear Algebra and Transformation Techniques**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Investigate the consistency of the system of equations and solve them (Apply – L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
CO 2	Determine the eigen vectors and inverse, powers of a matrix using Cayley – Hamilton Theorem (Apply - L3)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
CO 3	Use the concepts of Laplace Transforms to various forms of functions (Understand – L2)	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-

CO 4	Solve ordinary differential equations by using Laplace Transforms (Apply – L3)	2	1	-	**1**	-	-	-	-	-	-	-	1	-	-	-
CO 5	Apply Z - Transforms to solve difference equations (Apply – L3)	3	2	-	**2**	-	-	-	-	-	-	-	1	-	-	-
	Average	**2.80**	**1.80**	**-**	**1.80**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**-**	**-**
20FE08	**Engineering Physics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Analyse the different mechanical properties of materials (Understand – L2).	3	3	1	1	-	-	-	-	-	-	-	1	-	-	-
CO 2	Apply the lasers and optical fibres in different fields (Apply - L3).	3	2	1	1	-	-	-	-	-	-	-	1	-	-	-
CO 3	Summarize the properties of sound waves (Understand – L2).	3	3	1	1	-	-	-	-	-	-	-	1	-	-	-
CO 4	Classify the different types of magnetic and dielectric materials (Understand - L2).	3	3	1	1	-	-	-	-	-	-	-	1	-	-	-
CO 5	Identify the properties of superconducting and nano materials (Understand – L2).	3	3	1	1	-	-	-	-	-	-	-	1	-	-	-
	Average	**3.00**	**2.80**	**1.00**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**-**	**-**	**-**
20CS01	**Programming for Problem Solving using C**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Familiar with syntax and semantics of the basic programming language constructs. (Understand - L2)	2	3	-	-	-	-	-	-	-	1	-	1	-	-	-
CO 2	Construct derived data types like arrays in solving problem. (Apply - L3)	2	3	2	1	-	-	-	-	-	1	-	1	-	-	-
CO 3	Decompose a problem into modules and reconstruct it using various ways of userdefined functions. (Apply - L3)	2	3	2	1	-	-	-	-	-	1	-	1	-	-	-
CO 4	Use user-defined data types like structures and unions and its applications to solve problems. (Apply- L3)	2	3	2	-	-	-	-	-	-	1	-	1	-	-	-

CO 5	Discuss various file I/O operations and its application. (Understand - L2)	2	3	2	-	-	-	-	-	-	1	-	1	-	-	-
	Average	**2.00**	**3.00**	**2.00**	**1.00**	**-**	**-**	**-**	**-**	**-**	**1.00**		**1.00**	**-**	**-**	**-**
20ME02	**Engineering Mechanics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Apply free body diagram concepts to analyze rigid bodies in static conditions. (Apply-L3)	3	2	-	1	-	-	-	-	-	-	-	2	1	3	3
CO 2	Apply the equilibrium Equations of rigid bodies associated with frictional forces. (ApplyL3)	2	3	1	-	-	-	-	-	-	-	-	2	-	-	3
CO 3	Identify the location of centroid / centre of gravity and evaluate the moment of inertia of plane sections/solids. (Apply-L3)	3	2	-	-	-	-	-	-	-	-	-	2	1	3	3
CO 4	Understand the behavior of moving bodies in rectilinear motion using kinematic equations or motion curves. (Understand-L2)	2	2	1	-	-	-	-	-	-	-	-	2	-	-	2
CO 5	Examine the behavior of moving bodies using dynamic equilibrium conditions. (Apply-L3)	3	2	-	-	-	-	-	-	-	-	-	2	-	-	3
	Average	**2.60**	**2.20**	**1.00**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**1.00**	**3.00**	**2.80**
20MC01	**Constitution of India**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Understand history and philosophy of constitution with reference to Preamble, Fundamental Rights and Duties (Understand – L2).	-	-	-	-	-	3	3	3	-	2	-	3	-	-	-
CO 2	Understand the concept of Unitary and Federal Government along with the role of President, Prime Minister and Judicial System (Understand – L2).	-	-	-	-	-	3	2	3	-	2	-	3	-	-	-
CO 3	Understand the structure of the state government, Secretariat, Governor and Chief Minister and their functions (Understand – L2)	-	-	-	-	-	3	3	3	-	2	-	3	-	-	-
CO 4	Learn local administration viz. Panchayat, Block, Municipality and Corporation (Understand – L2).	-	-	-	-	-	3	2	3	-	2	-	3	-	-	-

CO 5	learn about Election Commission and the process and about SC, ST, OBC and women (Understand – L2).	-	-	-	-	-	3	3	3	-	2	-	3			
	Average	**-**	**-**	**-**	**-**	**-**	**3.00**	**2.50**	**3.00**		**2.00**		**3.00**	**-**	**-**	**-**
20FE51	**Professional Communication Skills Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Introduce oneself and others using appropriate language and details (Understand – L2)	-	-	-	-	3	-	-	-	-	3	3	-	-	-	-
CO 2	Comprehend short talks and speak clearly on a specific topic using error free English (Understand – L2)	-	-	-	-	3	-	-	-	-	3	3	-	-	-	-
CO 3	Suitable discourse. Report effectively after participating in informal discussions ethically (Remember –L1)	-	-	-	-	3	-	-	-	-	3	3	-	-	-	-
CO 4	Interpret data aptly, ethically & make oral presentations (Apply – L3)	-	-	-	-	3	-	-	-	-	3	3	-	-	-	-
	Average	**-**	**-**	**-**	**-**	**3.00**	**-**	**-**	**-**	**-**	**3.00**	**3.00**	**-**	**-**	**-**	**-**
20FE55	**Engineering Physics Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO 1	Analyze the wave characteristics of light (Understand – L2).	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
CO 2	Determine the wavelength of laser source and width of slit (Apply - L3)	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
CO 3	Estimate the magnetic field using Stewart's and Gee's apparatus and the rigidity modulus of material using Torsional Pendulum (Understand - L2).	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
CO 4	Identify the phenomena of resonance in strings (Understand – L2).	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
CO 5	Improve report writing skills and individual teamwork with ethical values (Understand – L2)	3	2	1	1	-	-	-	-	1	-	-	1	-	-	-
	Average	**3.00**	**2.00**	**1.00**	**1.00**	**-**	**-**	**-**	**-**	**1.00**	**-**	**-**	**1.00**	**-**	**-**	**-**

20CS51	Programming for Problem Solving using C Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Apply control structures of C in solving computational problems. (Apply - L3)	2	3	1	-	-	-	-	-	1	1	-	2	3	3	3
CO2	Implement derived data types & use modular programming in problem solving (Apply- L3)	2	3	1	-	-	-	-	-	1	1	-	2	3	2	3
CO3	Implement user defined data types and perform file operations. (Apply- L3)	2	3	1	-	-	-	-	-	1	1	-	2	2	-	-
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values. (Apply- L3)	2	3	1	-	-	-	-	-	1	1	-	2	-	-	-
	Average	2.00	3.00	1.00	-	-	-	-	-	1.00	1.00	-	2.00	2.67	2.50	3.00
20ME52	Engineering Mechanics and Fuel Testing Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Verify the basic laws of Mechanics in static environment. (Apply-L3)	2	1	-	2	-	-	-	-	3	2	-	-		2	3
CO2	Evaluate the forces in the mechanical systems. (Apply-L3)	2	1	-	2	-	-	-	-	3	2	-	-	2	1	2
CO3	Estimate various properties of fuel like Viscosity Flash and Fire point. (Apply-L3)	1	1	-	2	-	-	-	-	3	2	-	-	3	-	-
CO4	Determine calorific-value of fuels. (Apply-L3)	1	1	-	2	-	-	-	-	3	2	-	-	3	-	-
	Average	1.50	1.00	-	2.00	-	-	-	-	3.00	2.00	-	-	2.67	1.50	2.50
III SEMESTER(II BTECH -I SEM)																
20FE10	Numerical Methods and Integral Calculus	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Estimate the best fit polynomial for the given tabulated data using Interpolation.	3	2	-	2	-	-	-	-	-	-	-	1	-	-	-
CO2	Apply numerical techniques in solving of equations and evaluation of integrals.	3	2	-	2	-	-	-	-	-	-	-	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	Generate the single valued functions in the form of Fourier series and obtain Fourier series representation of periodic function.	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**
CO5	Evaluate the directional derivative, divergence and angular velocity of a vector function.	**3**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**
	Average	**3.00**	**1.60**	**-**	**1.50**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**-**	**-**
20ME03	**Fluid Mechanics and Hydraulic Machinery**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand the fundamentals of fluid mechanics and dimensional analysis and similarity concepts. (Understanding-L2)	3	2	2	3	-	-	-	-	-	3	-	3	2	-	3
CO2	Comprehend the kinematics and dynamics of fluid flows. (Understanding - L2)	3	3	3	2	-	-	-	-	-	-	-	3	2	-	2
CO3	Analyze boundary layer flow and friction losses in pipes. (Analyzing-L4)	2	1	3	2	1	-	-	-	-	-	-	3	2	-	3
CO4	Apply impulse momentum concept to impact of jet problems. (Applying-L3)	2	1	2	3	-	-	-	-	-	-	-	3	3	-	3
CO5	Evaluate the performance parameters of hydraulic turbines and pumps. (Applying-L3)	3	2	3	2	1	-	-	-	-	-	-	3	2	-	2
	Average	**2.60**	**1.80**	**2.60**	**2.40**	**1.00**	**-**	**-**	**-**	**-**	**3.00**	**-**	**3.00**	**2.20**	**-**	**2.60**
20ME04	**Thermodynamics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Classify the various thermodynamic systems, properties and processes with examples and temperature scale of a system.	3	2	1	-	-	-	-	-	-	-	-	1	-	-	-
CO2	Differentiate open and closed system and built up the heat and work transfer relations of thermal systems.	3	3	2	3	-	-	-	-	2	-	-	-	3	-	-
CO3	Apply the laws of thermodynamics to find the thermodynamic properties and parameters of various thermal systems.	3	1	1	3	-	-	2	-	1	1	-	2	2	-	2

CO4	Understand the properties of pure substance and gases to compute the non-reactive mixture parameters.	3	3	2	2	-	2	1	3	-	-	-	2	3	-	3
CO5	Analyse the performance parameters of various thermodynamic cycles.	3	3	-	3	-	-	2	-	3	2	-	3	3	-	3
	Average	**3.00**	**2.40**	**1.50**	**2.75**	**-**	**2.00**	**1.67**	**3.00**	**2.00**	**1.50**		**2.00**	**2.75**	**-**	**2.67**
20ME05	**Metallurgy and Material Science**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Comprehend the structure of materials, alloys and correlated the material properties with structure.	1	2	-	1	-	-	-	-		-	-	1	-	2	
CO2	Illustrate the procedure of drawing the equilibrium diagrams and apply the principle of equilibrium diagrams in evaluating the materials properties.	1	2	-	1	-	-	-	-	-	-	-	1	-	2	-
CO3	Recall the properties, applications of ferrous, non ferrous and composite materials.	1	2	-	1	-	-	-	-	-	-	-	1	-	2	-
CO4	Apply the principle of mechanical working on metals and heat treatment on materials.	1	3	-	1	-	-	-	-	-	-	-	1	-	2	-
CO5	Identify the types of composite materials and the manufacturing processes of fiber reinforced composites.	1	3	-	1	-	-	-	-	-	-	-	1	-	2	-
	Average	**1.00**	**2.40**	**-**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**2.00**	**-**
20ME06	**Mechanics of Solids**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Compute the stresses and deformations of a member subjected to axial and flexural loading.	3	2	1	-	-	-	-	-	-	-	-	2	-	-	3
CO2	Construct shear force and bending moment diagrams along the length of statically determinate beams.	2	3	1	-	-	-	-	-	-	-	-	2	-	-	3
CO3	Comprehend the variation of bending and shear stresses across the cross section of the beams	3	2	1	-	-	-	-	-	-	-	-	2	-	-	3
CO4	Analyse the structural members subjected to biaxial stresses.	3	2	1	-	-	-	-	-	-	-	-	2	-	-	3

CO5	Formulate the equations for stresses and deformations due to various loads	3	2	1	-	-	-	-	-	2	-	-	2	-	-	3
	Average	**2.80**	**2.20**	**1.00**	**-**	**-**	**-**	**-**	**-**	**2.00**	**-**	**-**	**2.00**	**-**	**-**	**3.00**
20MC02	**Environmental Science**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.	3	3	-	-	-	3	3	3	-	-	-	3	-	-	-
CO2	Evaluate local, regional and global environmental issues related to resources and their sustainable management.	3	3	-	-	-	3	3	-	-	-	-	3	-	-	-
CO3	Realize the importance of ecosystem and biodiversity for maintaining ecological balance.	3	-	3	-	-	-	2	-	-	-	-	2	-	-	-
CO4	Acknowledge and prevent the problems related to pollution of air, water and soil.	3	-	-	-	-	2	3	2	-	-	-	3	-	-	-
CO5	Identify the significance of implementing environmental laws and abatement devices for environmental management.	3	3	3	3	-	3	3	3	-	-	-	3	-	-	-
	Average	**3.00**	**3.00**	**3.00**	**3.00**	**-**	**2.75**	**2.80**	**2.67**	**-**	**-**	**-**	**2.80**	**-**	**-**	**-**
20ME55	**Fluid Mechanics and Hydraulic Machinery Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the need and use of various flow measuring devices	2	2	-	3	-	-	-	-	1	-	-	2	-	-	3
CO2	Apply the Bernoulli's equation for energy balance of a variable fluid flow systems	2	2	2	3	-	-	-	-	1	-	-	2	-	-	-
CO3	Determine the friction losses of fluid flow in different pipes	-	-	1	3	-	-	-	-	-	-	-	2	-	-	-
CO4	Evaluate the performance characteristics of hydraulic pumps, turbines and impact of jets	2	2	3	1	-	-	-	-	1	-	-	2	-	-	3
	Average	**2.00**	**2.00**	**-**	**2.50**	**-**	**-**	**-**	**-**	**1.00**		**-**	**-**	**-**	**-**	**3.00**
20ME56	**Mechanics of solids and Metallurgy Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO1	Evaluate the mechanical properties of materials by conducting various tests.	2	1	2	3	-	-	2	-	-	-	-	2	-	-	3
CO2	Estimate the behaviour of various materials under different loading.	3	2	2	3	-	-	2	-	-	-	-	2	-	-	3
CO3	Identify the material by observing the microstructure.	3	-	2	3	-	-	-	-	-	-	-	1	-	3	-
CO4	Perform the hardness test and heat treatment of steels.	3	-	2	3	1	-	-	-	-	-	-	2	-	3	-
	Average	**2.75**	**1.50**	**-**	**3.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.00**	**3.00**
20AD53	**Programming Using Python Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify various programming constructs available in Python and apply them in solving computational problems.	3	-	-	2	1	-	-	-	-	-	-	-	3		
CO2	Demonstrate data structures available in Python and apply them in solving computational problems.	-	3	2	3	2	-	-	-	-	-	-	-	3		
CO3	Implement modular programming, string manipulations and Python Libraries	-	3	2	3	2	-	-	-	-	-	-	-	3		
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.	-	-	-	-	-	-	-	2	2	2	-	-			
	Average	**3.00**	**3.00**	**-**	**2.67**	**-**	**-**	**-**	**-**	**2.00**	**2.00**	**-**	**-**	**3.00**		
20MES1	**Technical Drawing using Drafting Package**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand the Auto-CAD basics for 2D sketches used in industries. (Understanding - L2).	3	1	3	1	3	-	-	1	2	-	-	2	1	-	1
CO2	Draw the machine components using 3D modelling commands. (Applying –L3)	3	2	3	2	3	-	-	1	2	-	-	2	3	-	3
CO3	Edit the 3D solid Models using solid editing commands. (Understanding - L2)	1	1	3	1	3	-	-	1	2	-	-	2	1	-	1

CO4	Extract the Orthographic views of the models in Wire Frame, Surface & Solid Modelling. (Applying –L3)	3	2	3	2	3	-	-	1	2	-	-	2	1	-	1
	Average	**2.50**	**1.50**	**3.00**	**1.50**	**3.00**	**-**	**-**	**1.00**	**2.00**	**-**	**-**	**2.00**	**1.50**	**-**	**1.50**
IV SEMESTER(II BTECH -II SEM)																
20FE09	**Probability and Statistics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand various probabilistic situations using the various laws of probability and random variables. -L2	3	2	1	2	-	-	-	-	-	-	-	2	-	-	-
CO2	Apply probability distributions like Binomial, Poisson, Normal and Exponential distributions in solving engineering problems.-L3	3	2	2	3	-	-	-	-	-	-	-	2	-	-	-
CO3	Calculate the standard error of sampling distribution and confidence intervals for parameters like mean and proportion based on the sample data.-L3	3	2	2	2	-	-	-	-	-	-	-	2	-	-	-
CO4	Analyse the data scientifically with the appropriate statistical methodologies to apply the suitable test of hypothesis.-L4	3	3	3	3	-	-	-	-	-	-	-	2	-	-	-
CO5	Construct the regression lines to predict the dependent variables and calculate the Correlation Coefficient for a bivariate statistical data.-L3	3	2	2	3	-	-	-	-	-	-	-	2	-	-	-
	Average	**3.00**	**2.20**	**2.00**	**2.60**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**-**	**-**	**-**
20ME07	**Applied Thermodynamics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Describe the working of a Vapour power cycles and identify the suitable fuels for power plants.-L2	3	3	2	1	-	1	1	-	-	-	-	2	3	-	-
CO2	Identify the need of various boilers and draught systems for a thermal power cycle-L1	3	3	2	2	-	-	1	-	-	-	-	2	3	-	-

CO3	Apply thermodynamic analysis to study the characteristics of steam nozzles and steam condensers.-L3	3	3	2	2	-	-	-	-	-	-	-	2	3	-	-
CO4	Evaluate the performance characteristics of an impulse and reaction turbines-L3	3	3	2	2	-	-	-	-	-	-	-	2	3	-	-
CO5	Comprehend the different compressors used in thermal systems-L2	3	2	2	1	-	-	-	-	-	-	-	2	3	-	-
	Average	**3.00**	**2.80**	**2.00**	**1.60**	**-**	**1.00**	**1.00**	**-**	**-**	**-**	**-**	**2.00**	**3.00**	**-**	**-**
20ME08	**Production Technology**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Classify various manufacturing processes and illustrate the casting processes-L1	2	3	2	-	2	-	-	-	-	-	-	2	-	2	1
CO2	Recall the various welding techniques and explain gas welding and arc welding-L1	3	1	1	-	1	-	-	-	-	-	-	2	-	3	1
CO3	Illustrate resistance welding, special welding, soldering and brazing processes-L2	3	2	2	-	1	-	-	-	-	-	-	2	-	3	-
CO4	Understand the nature of plastic deformation and identify the types of metal forming processes.-L2	3	3	3	-	2	-	-	-	-	-	-	2	-	2	-
CO5	Distinguish various types of metal forming processes-L2	3	1	2	-	1	-	-	-	-	-	-	2	-	2	1
	Average	**2.80**	**2.00**	**2.00**	**-**	**1.40**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**-**	**2.40**	**1.00**
20ME09	**Theory of Machines**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Comprehend the layout and working of various mechanisams-L1	3	2	1	-	-	-	-	-	-	-	-	2	-	-	3
CO2	Analyse the velocity and accelerations of various kinematic links in a mechanism-L4	3	2	-	-	-	-	-	-	-	-	-	2	-	-	3
CO3	Analyse the gear kinematics and turning moment diagrams of engine-L4	3	2	-	-	-	-	-	-	-	-	-	2	-	-	3
CO4	Analyse the speed regulations in various types of governors-L4	3	2	-	-	-	-	-	-	-	-	-	2	-	-	3

CO5	Solve the balancing of the rotating parts and undamped, damped free vibrating mechanical systems-L3	3	2	1	-	-	-	-	-	-	-	-	2	-	-	3
	Average	**3.00**	**2.00**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**-**	**-**	**3.00**
20HS01	**Universal Human Values**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the value inputs in life and profession(Applying- L3)	2	3	2	-	-	-	-	3	-	-	-	2	-	-	-
CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the self, and the Body (Understanding - L2)	2	2	1	-	-	-	-	3	-	-	-	2	-	-	-
CO3	Understand the role of a human being in ensuring harmony in society. (Understanding - L2)	2	3	1	-	-	3	3	3	-	-	-	2	-	-	-
CO4	Understand the role of a human being in ensuring harmony in the nature and existence. (Understanding - L2)	2	2	3	-	-	3	-	3	-	-	-	2	-	-	-
CO5	Distinguish between ethical and unethical practices (Understanding - L2)	2	2	3	3	-	3	-	3	-	-	-	2	-	-	-
	Average	**2.00**	**2.40**	**2.00**	**3.00**	**-**	**3.00**	**3.00**	**3.00**	**-**	**-**	**-**	**2.00**	**-**	**-**	**-**
20ME57	**Production Technology Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Choose a suitable primary production process to design an industrial component. (Applying- L3)	3	2	2	3	1	-	-	-	2	-	-	1	-	3	2
CO2	Select a suitable production process for fabrication of designed component. (Applying- L3)	3	2	2	2	-	-	-	-	2	-	-	1	-	3	2
CO3	Choose a suitable mechanical press working operation to get the required shape of component. (Applying- L3)	3	1	2	3	1	-	-	-	2	-	-	1	-	2	-
CO4	Manufacture a plastic component using various plastic processing techniques. (Applying- L3)	3	1	2	2	-	-	-	-	2	-	-	1	-	2	-
	Average	**3.00**	**1.50**	**2.00**	**2.50**	**1.00**	**-**	**-**	**-**	**2.00**	**-**	**-**	**1.00**	**-**	**2.50**	**2.00**

20ME58	Theory of Machines Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Apply the dynamics of cams, gyroscopes for any practical problems. (Applying- L3)	1	1	1	-	-	-	-	-	3	2	-	2	-	-	3
CO2	Evaluate the speed regulations in governors. (Applying- L3)	2	1	1	-	-	-	-	-	3	2	-	2	-	-	3
CO3	Execute the static and dynamic balancing for rotating parts of a machine. (Applying- L3)	2	1	1	-	-	-	-	-	3	2	-	2	-	-	3
CO4	Analyze the vibration parameters of oscillating bodies.	2	2	1	-	-	-	-	-	3	2	-	2	-	-	3
	Average	**1.75**	**1.25**	**1.00**	**-**	**-**	**-**	**-**	**-**	**3.00**	**2.00**	**-**	**2.00**	**-**	**-**	**3.00**
20ME59	**Computer Aided Machine Drawing Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Comprehend basic conventions needed for machine drawing. (Applying- L3)	1	-	2	-	3	-	-	-	-	1	-	1	-	3	3
CO2	Construct the machine elements with suitable proportions used in mechanical systems. (Applying- L3)	1	-	2	-	3	-	-	-	-	1	-	1	-	3	3
CO3	Execute the assembly drawings of engine parts. (Applying- L3)	1	-	2	-	3	-	-	-	-	1	-	1	-	3	3
CO4	Execute the assembly drawings of machine parts. (Applying- L3)	1	2	2	-	3	-	-	-	-	1	-	1	-	3	3
	Average	**1.00**	**2.00**	**2.00**	**-**	**3.00**	**-**	**-**	**-**		**1.00**	**-**	**-**	**-**	**3.00**	**3.00**
20MES2	**Structural And Modal Analysis using ANSYS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand the basics and fundamentals related to Finite Element Method. (Understanding - L2)	3	2	2	1	-	-	-	-	2	2	-	1	3	3	3
CO2	Apply the knowledge of ANSYS to solve the engineering problems. (Applying- L3)	3	2	2	2	-	-	-	-	2	2	-	2	3	3	3
CO3	Perform the static structural analysis in 1D, 2D and 3D using ANSYS work bench. (Applying- L3)	3	2	2	-	3	-	-	-	2	2	-	1	3	3	3

CO4	Analyse the mode shapes of structures and machine elements. (Analysing- L4)	2	3	2	3	3	-	-	-	1	2	-	2	2	2	2
	Average	**2.75**	**2.25**	**2.00**	**2.00**	**3.00**	**-**	**-**	**-**	**1.75**	**2.00**	**-**	**1.50**	**2.75**	**2.75**	**2.75**
V SEMESTER(III BTECH -I SEM)																
20ME10	**IC Engines and Gas Turbines**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain the basic concepts of actual cycles with analysis and describe the fundamental concepts of IC engines along with its working principles (Understanding - L2)	1	-	1	2	-	-	3	-	-	-	-	2	3	1	2
CO2	Describe the combustion phenomenon in SI and CI engines (Understanding - L2)	3	-	-	3	-	-	-	-	-	-	-	3	3	1	2
CO3	Evaluate the performance of IC engines and the importance of alternative fuels (Applying- L3)	-	-	3	1	-	-	-	-	-	-	-	2	3	1	2
CO4	Classify the essential components of gas turbine along with its performance improving methods	1	2	-	1	-	-	-	-	2	1	-	1	-	3	2
CO5	Illustrate the working principle of different types of jet propulsive engines and rockets (Understanding - L2)	-	-	-	1	-	-	3	-	2	-	-	2	3	1	2
	Average	**1.67**	**2.00**	**2.00**	**1.60**	**-**	**-**	**3.00**	**-**	**2.00**	**1.00**		**2.00**	**3.00**	**1.40**	**2.00**
20ME11	**Machine Tools and Metrology**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand the concepts of metal cutting theory and fundamentals of lathe machine and its operations (Understanding - L2)	1	3	2	-	-	2	-	-	-	-	-	2	-	3	2
CO2	Differentiate various machining processes and determine machining time calculations (Understanding - L2)	3	1	-	-	-	2	-	-	-	-	-	2	-	3	-
CO3	Comprehend the principles of finishing processes and differentiate them (Understanding - L2)	3	2	-	-	-	2	-	-	-	-	-	2	-	2	-

CO4	Identify the instruments to measure linear, angular and surface texture parameters (Understanding - L2)	3	2	-	-	-	-	-	-	-	-	-	2	-	1	-
CO5	Apply limits and fits on machine components and perform alignment tests on machine tools (Applying- L3)	1	2	3	2	1	-	-	-	-	-	-	3	-	-	3
	Average	**2.20**	**2.00**	**2.50**	**2.00**	**1.00**	**2.00**	**-**	**-**	**-**	**-**	**-**	**2.20**	**-**	**2.25**	**2.50**
20ME12	**Design of Machine Elements-I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Formulate and analyse (two action verbs side by side) simple stresses in machine parts subjected to static loads. (Applying- L3)	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO2	Analyse the failure criterion of mechanical parts subjected to fatigue loads. (Analysis level -L4).	2	3	1	-	-	-	-	-	-	-	-	-	-	-	3
CO3	Comprehend the design of permanent joints subjected to various types of loads. (Apply level-L3).	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO4	(Interpret) Analyse the temporary joints subjected to axial and eccentric loads (Analysis level -L4).	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3
CO5	Design the shafts for various applications of engineering. (Apply level-L3).	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3
	Average	**2.60**	**2.00**	**1.40**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.00**
20ME13	**Non-Conventional Energy Sources**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate the potentials of nonconventional energy sources and solar energy harnessing devices (Remembering level –L1).	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO2	Apply the principles of energy conversion to study wind and Geothermal energy plants (Apply level-L3).	2	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO3	Understand the power generating capacities of tide energy, wave energy and ocean thermal energy plants (Understanding level-L2).	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-

CO4	Describe the biomass production system technologies and their capacities for generating power (Understanding level-L2).	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO5	Comprehend the direct energy conversion principles, systems and potential for power generation (Remembering level-L1).	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
	Average	**1.20**	**1.00**	**-**	**-**	**-**	**3.00**	**3.00**	**-**	**-**	**-**	**-**	**2.00**	**2.00**	**-**	**-**
20ME14	**Robotics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand the anatomy of robots, end effectors and its applications (Understanding - L2)	3	-	-	1	3	2	-	-	2	-	-	3	-	2	2
CO2	Familiarize the working principle of actuators and sensors for robots (Understanding - L2)	2	-	-	3	3	3	-	-	2	2	-	2	-	2	2
CO3	Comprehend the forward and inverse kinematics of robots and apply D-H parameters for solving robot kinematics problems (Understanding - L2)	3	3	2	2	3	-	-	-	3	-	-	3	-	-	3
CO4	Solve the dynamic behaviour of robot (Applying-L3)	1	3	2	3	3	-	-	-	2	-	-	3	-	-	3
CO5	Analyze the trajectory of robotic motion and comprehend the applications of robots (Analysis level -L4).	2	3	1	1	3	-	-	-	2	-	-	3	-	-	2
	Average	**2.20**	**3.00**	**1.67**	**2.00**	**3.00**	**2.50**	**-**	**-**	**2.20**	**2.00**	**-**	**2.80**	**-**	**2.00**	**2.40**
20ME15	**Mechanical Vibrations**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Formulate the governing equations for undamped free vibrations of single degree of freedom systems and its solutions (Applying- L3)	2	3	1	-	-	-	-	-	-	-	-	-	-	-	3
CO2	Calculate the damped parameters of single degree of freedom of systems subjected to free vibrations (Applying- L3)	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3

CO3	Understand the response of various mechanical systems under harmonic excitation conditions (Understanding - L2)	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO4	Analyse the two degree of freedom systems to get their response in terms of natural frequencies and mode shapes (Analysis level -L4).	1	3	2	-	-	-	-	-	-	-	-	-	-	-	3
CO5	Analyse the multi degree of freedom systems to find the response by using different methods (Analysis level -L4).	1	3	2	-	-	-	-	-	-	-	-	-	-	-	3
	Average	**2.00**	**2.60**	**1.40**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.00**
20ME16	**Operations Research**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply linear programming approach for optimizing the objectives of industrial oriented problems. (Applying- L3)	3	1	2	2	-	-	-	-	-	-	-	1	-	3	-
CO2	Formulate and solve Transportation Models and assignment Models (Applying- L3)	3	3	1	2	-	-	-	-	-	-	-	1	-	3	-
CO3	Implement the strategies in competitive situations and Identify the replacement period of machinery. (Applying- L3)	2	3	2	2	-	-	-	-	-	-	-	1	-	2	-
CO4	Analyze the waiting situations in the organization (Analysis level -L4).	2	3	1	2	-	-	-	-	-	-	-	1	-	2	-
CO5	Resolve the complex problem into simple problems by dynamic programming approach and apply optimum strategies.	3	2	3	2	-	-	-	-	-	-	-	1	-	3	-
	Average	**2.60**	**2.40**	**1.80**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**2.60**	**-**
20ME60	**Thermal Engineering Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Examine the valve timing diagram and port timing diagram of internal combustion engines (Applying- L3)	3	2	3	2	-	1	1	-	-	-	-	2	2	-	-

CO2	Analyse the performance characteristics of an internal combustion engine (Analysis level -L4).	3	3	2	3	-	2	2	-	-	-	-	2	3	-	-
CO3	Estimate the energy distribution and frictional power of diesel engine using heat balance and morse test (Applying- L3)	2	3	3	2	-	2	2	-	-	-	-	2	3	-	-
CO4	Describe the performance parameters of refrigeration systems and air compressor (Understanding Level –L2)	2	3	3	2	-	1	1	-	-	-	-	1	2	-	-
	Average	**2.50**	**2.75**	**3.00**	**2.25**	**-**	**1.50**	**1.50**	**-**	**-**	**-**	**-**	**1.75**	**2.50**	**-**	**-**
20ME61	**Machine Tools and Metrology Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Develop sequence of machining operations to produce the component (Apply level -L3).	2	1	3	1	-	-	-	-	3	1	-	2	-	3	-
CO2	Capable of manufacturing components according to given drawings using various machine tools (Apply level -L3)	3	2	2	3	-	-	-	-	3	1	-	2	-	3	-
CO3	Perform linear,angular and gear measurements of machined components (Apply level -L3)	3	-	2	3	-	-	-	-	3	1	-	1	-	-	3
CO4	Analyze the measurement of the surface roughness and perform alignment tests (Analysis level -L4)	3	-	2	3	-	-	-	-	3	1	-	2	-	-	3
	Average	**2.75**	**1.50**	**2.25**	**2.50**	**-**	**-**	**-**	**-**	**3.00**	**1.00**	**-**	**1.75**	**-**	**3.00**	**3.00**
	Skill Advanced Course/Soft Skills Course	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the report writing skills in the document after training (Apply level-L3).	3	2	2	1	-	-	-	-	2	2	-	1	3	3	3
CO2	Evaluate the quality report writing skills in the document (Apply level-L3).	3	2	2	2	-	-	-	-	2	2	-	2	3	3	3
CO3	Organize thoughts and ideas into a compelling presentation. (Apply level-L3).	3	2	2	-	3	-	-	-	2	2	-	1	3	3	3

CO4	Compile/Interact information together in a different way by combining artifacts (Analysis level -L4).	2	3	2	3	3	-	-	-	1	2	-	2	2	2	2
	Average	**2.75**	**2.25**	**2.00**	**2.00**	**3.00**	**-**	**-**	**-**	**1.75**	**2.00**	**-**	**1.50**	**2.75**	**2.75**	**2.75**
20PIO1	**Summer Internship**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the academic knowledge in Industry (Apply level -L3).	2	1	2	1	1	1	3	2	1	-	-	1	2	2	2
CO2	Understand administrative functions and ethical principles of the organisation (Understanding level -L2).	-	-	-	-	-	-	-	3	2	1	2	2	-	-	-
CO3	Analyse and develop the concepts by practical observation and modern tool usage practices (Analysis level -L4).	3	3	3	1	3	-	1	2	-	-	-	1	2	2	2
CO4	Improve the report writing skills (Apply level-L3).	-	2	-	1	-	-	-	2	-	3	-	3	-	-	-
	Average	**2.50**	**2.00**	**2.50**	**1.00**	**2.00**	**1.00**	**2.00**	**2.25**	**1.50**	**2.00**	**2.00**	**1.75**	**2.00**	**2.00**	**2.00**
VI SEMESTER(III BTECH -II SEM)																
20ME17	**Heat Transfer**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand the basic heat transfer principles and their practical relevance in Planes, Cylinders and Spherical components. (Understanding Level L2)	3	2	1	2	-	3	1	3	-	-	-	2	1	-	1
CO2	Analyse steady and unsteady state heat transfer concepts and fins. (Analysing – L4)	3	3	2	3	-	3	1	3	-	1	-	2	2	-	1
CO3	Formulate the expressions to solve free and forced convection problems related to external and internal flows. (Applying -L3)	3	3	3	2	-	1	1	3	-	-	-	2	3	-	1
CO4	Apply the concepts of heat transfer in boiling, condensation and radiation thermal systems. (Applying -L3)	3	2	2	1	-	2	2	3	-	-	-	2	1	-	1

CO5	Design the simple heat exchanger for engineering applications using the data hand book. (Analysing – L4)	3	3	3	2	-	3	1	3	-	1	-	3	3	-	2
	Average	**3.00**	**2.60**	**2.20**	**2.00**	**-**	**2.40**	**1.20**	**3.00**	**-**	**1.00**	**-**	**2.20**	**2.00**	**-**	**1.20**
20ME18	**CAD/CAM**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Comprehend the principles of CAD/CAM for design and manufacturing (Understanding Level L2)	2	-	3	-	-	-	-	-	-	-	-	1	-	3	-
CO2	Formulate mathematical equations for geometrical entities like curves, surface, and solids.(Apply-L3)	1	3	-	-	-	-	-	-	-	-	-	3	-	3	-
CO3	Write the program for part profiles to accomplish numerical control machining (Apply-L3)	3	1	2	2	-	-	-	-	-	-	-	3	-	3	-
CO4	Discuss the codes for different parts using GT and apply in automated manufacturing systems. (Understanding Level L2)	3	-	3	2	-	-	-	-	-	-	-	3	-	3	-
CO5	Contrast CAQC techniques and comprehend the applications of Computer Integrated Manufacturing. (Understanding Level L2)	-	-	3	-	-	-	-	-	-	-	-	3	-	3	-
	Average	**2.25**	**2.00**	**2.75**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.60**	**-**	**3.00**	**-**
20ME19	**Design of Machine Elements-II**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Select suitable bearings under different load, speed, and life conditions. (Applying - L3)	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO2	Design internal combustion engine components for safe and continuous operation. (Applying - L3)	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3
CO3	Select the belt and rope drives for elevators, cranes, and hoisting machinery. (Applying - L3)	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3
CO4	Design the springs under static and dynamic loads. (Applying - L3)	1	2	3	-	-	-	-	-	-	-	-	-	-	-	3

CO5	Estimate the performance parameters of the gears for various loading conditions. (Applying - L3)	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3
	Average	**2.20**	**1.60**	**2.50**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.00**
20ME21	**Modern Machining Processes**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Assort appropriate unconventional machining processes for machining materials and to develop relevant industrial solutions for machining materials. (Understanding Level L2)	3	-	-	-	-	-	-	-	-	-	-	2	-	3	-
CO2	Understand the principles of Electro Chemical Machining Process for machining of materials. (Understanding Level L2)	3	2	-	-	-	-	-	-	-	-	-	2	2	3	-
CO3	Comprehend Electrical Discharge Machining principles for machining intricate components (Understanding Level L2)	3	2	-	-	-	-	-	-	-	-	-	2	2	3	-
CO4	Differentiate the basic principles and applications of thermal machining processes like EBM, LBM and PAM. (Understanding Level L2)	3	-	-	1	-	-	-	-	-	-	-	2	-	3	-
CO5	Identify the appropriate Rapid Prototyping Processes for manufacturing various components (Understanding Level L2)	2	3	-	-	-	-	-	-	-	-	-	2	-	3	-
	Average	**2.80**	**2.33**	**-**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.00**	**2.00**	**3.00**	**-**
20EE84	**Electric Vehicles 20EE84**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Illustrate propulsion system for an electric vehicles (Understanding Level -L2)	2	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	Understand characteristics and properties of batteries. (Understanding Level-L2)	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Analyse ratings and requirements of electrical machines. (Understanding Level -L2)	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Analyse mechanism of electrical vehicle drive train. (Understanding Level -L2)	2	2	-	-	-	-	-	-	-	-	-	1	-	-	-

CO5	Understand configuration of hybrid electric vehicles. (Understanding Level -L2)	2	2	-	-	-	-	-	-	-	-	-	1	-	-	-
	Average	**2.00**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**-**	**-**	**-**
20ME62	**Heat Transfer Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate the thermal conductivity of different materials and powders. (Applying - L3)	1	2	2	3	-	-	-	-	3	1	-	-	3	-	-
CO2	Estimate the value of heat transfer coefficient in free and forced convection. (Applying - L3)	1	2	2	3	-	-	-	-	3	1	-	-	3	-	-
CO3	Validate the Stefan Boltzman constant and estimate emissivity of grey body.(Applying - L3)	2	1	2	3	-	-	-	-	3	1	-	-	3	-	-
CO4	Compare the parallel and counter flow heat exchanger performance characteristics. (Analysing - L4).	1	2	2	3	-	-	-	-	3	1	-	-	3	-	-
	Average	**1.25**	**1.75**	**2.00**	**3.00**	**-**	**-**	**-**	**-**	**3.00**	**1.00**	**-**	**-**	**3.00**	**-**	**-**
20ME63	**CAD/CAM Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Design and assemble the mechanical components using CAD Software (Analyse -L4)	3	-	3	1	3	-	-	-	3	1	-	3	-	2	3
CO2	Apply finite element analysis for components using analysis software. (Apply-L3)	3	-	3	2	3	-	-	-	3	1	-	3	-		3
CO3	Develop NC code for different part profiles and perform machining on CNC Machine tools.(Apply-L3)	3	-	3	2	3	-	-	-	3	1	-	3	-	3	2
CO4	Simulate part program to perform various operations on CNC machine (Apply-L3)	3	-	2	3	3	-	-	-	3	1	-	3	-	3	2
	Average	**3.00**	**-**	**2.75**	**2.00**	**3.00**	**-**	**-**	**-**	**3.00**	**1.00**	**-**	**3.00**	**-**	**2.67**	**2.50**
20ME64	**Robotics and Simulation Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Simulate forward and inverse kinematic movements of a robot using Robo Analyzer and MATLAB. (Understanding - L2)	1	-	3	-	3	2	-	-	2	-	-	3	-	2	2

CO2	Perform the demo operations on SCARA and PUMA using Robo analyzer software. (Applying - L3)	2	-	-	-	3	3	-	-	2	2	-	3	-	-	2
CO3	Experiment the robot operations like palletizing, gluing, spray painting, polishing, loading and Unloading. (Applying - L3)	3	3	2	-	3	-	-	-	3	-	-	3	-	-	3
CO4	Develop Robot Programmes to use to control commands. (Analysing - L4)	3	2	1	-	3	-	-	-	2	-	-	3	-	-	3
	Average	**2.25**	**2.50**	**2.00**	**-**	**3.00**	**2.50**	**-**	**-**	**2.25**	**2.00**	**-**	**3.00**	**-**	**2.00**	**2.50**
20HSS1	**Soft Skills Course**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	To Develop self-awareness and personality traits for professional growth (Understand – L2)	-	-	-	-	2	-	-	3	3	3	-	2	-	-	-
CO2	Work effectively in multi-disciplinary and heterogeneous teams through knowledge of teamwork, Inter-personal relationships, conflict management and leadership quality.(Apply – L3)	-	2	-	-	2	-	-	3	3	3	-	3	-	-	-
CO3	Communicate through verbal/oral communication with good listening skills and empathy (Apply – L3)	-	-	-	-	2	-	-	3	3	3	-	3	-	-	-
CO4	Apply skills required to qualify in recruitment tests, Interviews & other professional assignments (Apply – L3)	-	-	-	-	2	-	-	3	3	2	-	1	-	-	-
	Average	**-**	**2.00**	**-**	**-**	**2.00**	**-**	**-**	**3.00**	**3.00**	**2.75**	**-**	**2.25**	**-**	**-**	**-**
VII SEMESTER (IV BTECH -I SEM)																
(20ME24)	**Refrigeration and Air Conditioning**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Describe the basic concepts of refrigeration and its applications (Understanding -L2).	1	3	2	3	-	2	2	-	-	-	-	2	3	-	-
CO2	Evaluate the performance parameters of refrigeration systems (Applying –L3).	2	3	3	3	-	-	-	-	-	-	-	2	3	-	-

CO3	Identify the desirable refrigerants and its use in various refrigeration systems (Remembering –L1).	2	2	3	3	-	-	-	-	-	-	-	2	3	-	-
CO4	Analyse the psychometric properties and processes used in air conditioning systems (Analysing –L4).	2	3	3	-	-	2	-	-	-	-	-	2	3	-	-
CO5	Estimate the performance parameters of air conditioning systems. (Applying –L3)	3	2	2	3	-	-	2	-	-	-	-	2	3	-	-
	Average	**2.00**	**2.60**	**2.60**	**3.00**	**-**	**2.00**	**2.00**	**-**	**-**	**-**	**-**	**2.00**	**3.00**	**-**	**-**
(20ME26)	**Finite Element Methods**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Formulate the equilibrium equations for solving static engineering problems.(Applying -L3)	3	-	-	2	-	-	2	-	-	-	-	1	1	1	2
CO2	Compute the characteristics of flexural elements under different loading conditions (Applying-L3).	3	2	-	2	-	-	2	-	-	-	-	1	2	-	2
CO3	Analyse 2-D structures with iso-parametric elements along with Axi-symmetric problems.(Analyzing-L4)	3	2	3	-	-	1	-	-	-	-	-	1	-	-	3
CO4	Apply the finite element techniques for solving thermal problems of different geometries (Applying-L3).	2	2	3	-	-	-	-	-	-	-	-	1	-	-	3
CO5	Compute the Eigen values and vectors for bar and beam elements using for dynamic analysis. (Analyzing-L4)	3	2	3	-	-	-	-	-	-	-	-	1	-	-	3
	Average	**2.80**	**2.00**	**3.00**	**2.00**	**-**	**1.00**	**2.00**	**-**	**-**	**-**	**-**	**1.00**	**1.50**	**1.00**	**2.60**
(20ME29)	**Automobile Engineering**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	List and illustrate the basic components of Automobile (Understanding –L2).	-	3	2	-	-	-	2	-	-	-	-	2	2	-	-
CO2	Differentiate the Fuel supply systems in petrol and Diesel Engines (Understanding –L2).	-	-	-	-	-	2	3	2	-	1	-	2	2	-	-

CO3	Comprehend the function of various Electrical systems in Automobile (Understanding –L2).	-	-	2	-	-	2	2	-	-	-	-	-	2	-	1
CO4	Distinguish various transmission systems, Wheels & Tyres (Understanding –L2).	**1**	**1**	-	-	-	2	2	-	-	-	-	2	2	-	2
CO5	Compare various types of Steering systems, Braking systems and Suspension systems (Analysing –L4).	-	2	-	-	-	2	2	-	-	-	-	2	2	-	2
	Average	**1.00**	**2.00**	**2.00**	**-**	**-**	**2.00**	**2.20**	**2.00**	**-**	**1.00**	**-**	**2.00**	**2.00**	**-**	**1.67**
(20ME32)	**Power Plant Engineering**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Describe the energy scenario, the energy generation sources and various circuitry systems in power plants. (Understanding – L2)	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	Draw the layout of different power plants. (Remembering – L1)	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-
CO3	Compute the power generation from different power plants. (Applying – L3)	3	2	-	2	-	-	-	-	-	-	-	1	3	-	3
CO4	Analyse the input parameters requirement for power generation from various power plant systems. (Analyzing-L4)	2	3	-	1	-	-	-	-	-	-	-	2	2	-	2
CO5	Calculate the economics of power generation from various power plants, pollution issues from power plant systems. (Applying – L3)	3	2	-	2	-	-	-	-	-	-	-	3	3	-	3
	Average	**2.20**	**2.00**	**-**	**1.67**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.60**	**2.67**	**-**	**2.67**
(20ME35)	**Total Quality Management**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Comprehend the principles and strategies of quality control. (Understanding - L2)	-	-		-	-	-	-	-	-	-	3	3	1	3	2
CO2	Apply the principles of total quality management to improve the quality of the product.(Applying - L3)	3	-	2	-	-	2	-	-	-	-	3	3	3	3	3

CO3	Choose the appropriate statistical quality control tool to check the process capability.(Applying - L3)	2	3	3	-	-	-	-	-	-	-	3	3	2	2	2
CO4	Examine various TQM techniques for industrial applications. (Applying - L3)	2	-	3	-	-	-	-	-	-	-	3	3	1	3	2
CO5	Interpret ISO quality standards in an organization. (Understanding - L2)	1	-	3	-	-	2	2	-	-	-	3	3	3	3	3
	Average	**2.00**	**3.00**	**2.75**	**-**	**-**	**2.00**	**2.00**	**-**	**-**	**-**	**3.00**	**3.00**	**2.00**	**2.80**	**2.40**
20EE83	**UTILIZATION OF ELECTRICAL ENERGY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Choose a drive for particular application (Remembering Level – L2)	1	1	-	-	-	-	-	-	-	-	-	1	1	-	
CO2	Identify a heating /welding scheme for a given application (Understand Level – L2)	2	1	-	-	-	-	-	-	-	-	-	1	2	-	1
CO3	Illustrate the different schemes of traction and its main components (Understand Level – L2)	2	2	-	-	-	-	-	-	-	-	-	2	1	-	2
CO4	Develop a lighting scheme for a given practical case (Apply level -L3).	3	2	-	-	-	-	-	-	-	-	-	3	2	-	3
CO5	Assess the economic aspects in utilization of electrical energy (Understand Level – L2)	2	1	-	-	-	-	-	-	-	-	-	2	1	-	2
	Average	**2.00**	**1.40**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.80**	**1.40**	**-**	**2.00**
20CE82	**DISASTER MANAGMENT**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the basic terms, types of disasters and their impact (Understand Level – L2)	3	-	-	-	-	-	-	-	-	-	-	1	1	-	2
CO2	Illustrate the role of technology in handling disaster management situations(Understand-L2)	3	-	-	-	-	-	-	-	-	-	-	1	1	-	2
CO3	Identify the stake-holders concerned and design the different action plans for responding in case of disaster occurrence (Understand – L2)	3	-	-	-	-	-	-	-	-	-	-	1	1	-	2
CO4	Evaluate the importance of education and community approach for the responsive actions to	3	-	-	-	-	-	-	-	-	-	-	1	1	-	2

	be taken in case of disaster occurrence (Understand – L2)															
	Average	**3.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.00**	**1.00**	**-**	**2.00**
20PI02	**Industrial/Research Internship**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the engineering knowledge skills to understand and solve Industry problems (Applying level -L3).	3	1	2	1	1	1	-	-	1	-	-	3	3	3	3
CO2	Understand administrative functions and ethical principles of the organisation (Understanding level -L2).	1	-	-	-	-	-	-	3	2	2	1	2	2	2	2
CO3	Analyse and develop the concepts by practical observation and modern tool usage practices (Analysis level -L4)	2	3	3	1	3	-	-	2	1	-	-	2	2	2	2
CO4	Present the report writing skills (Apply level -L3).	-	2	-	1	-	-	-	-	1	3	-	1	3	3	3
	Average	**2.00**	**2.00**	**2.50**	**1.00**	**2.00**	**1.00**	**-**	**2.50**	**1.25**	**2.50**	**1.00**	**2.00**	**2.50**	**2.50**	**2.50**
	Skill Advanced Course (PRACTICAL FEA USING HYPERMESH AND LS-DYNA)	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the report writing skills in the document after training Apply Level -L3	3	2	2	1	-	-	-	-	2	2	-	1	3	3	3
CO2	Evaluate the quality report writing skills in the document (Apply Level- L3)	3	2	2	2	-	-	-	-	2	2	-	2	3	3	3
CO3	Organize thoughts and ideas into a compelling presentation. (Apply Level- L3)	3	2	2	-	3	-	-	-	2	2	-	1	3	3	3
CO4	Compile/Interact information together in a different way by combining artifacts (Analysis Level- L4)	2	3	2	3	3	-	-	-	1	2	-	2	2	2	2
	Average	**2.75**	**2.25**	**2.00**	**2.00**	**3.00**	**-**	**-**	**-**	**1.75**	**2.00**	**-**	**1.50**	**2.75**	**2.75**	**2.75**
VIII SEMESTER (IV BTECH -II SEM)																
20PI03	**Project Work**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**

CO1	Apply the engineering knowledge to prepare the prototype and experimental setup layouts. (Applying –L3)	3	1	2	1	-	-	-	-	-	1	2	2	3	3	3
CO2	Exhibit the individual and team work skills with professional and ethical values and communicate effectively with engineering society. (Applying-L3)	3	2	1	-	-	-	2	3	3	3	1	1	3	3	3
CO3	Solve the complex engineering problems relevant to society, industry, environment and sustainability. (Analysing -L4)	3	3	-	-	2	3	3	2	-	-	3	3	2	1	2
CO4	Implement the project management and modern IT Tools software tools to make a project reports with reasonable analysed results and discussions. (Analysing -L4)	3	3	-	3	3	2	1	1	1	2	-	2	2	2	1
CO5	Design and develop a prototype models and experimental setups with the knowledge of mathematics, science and engineering. (Designing –L6)	3	-	3	2	3	1	-	-	2	-	-	-	1	2	3
	Average	**3.00**	**2.25**	**2.00**	**2.00**	**2.67**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.20**	**2.20**	**2.40**