Raosaheb Wangde Master Charitable Trust's

DNYANSHREE
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Mechanical Engineering

Academic Year - 2021 - 22

CO PO Mapping of All Courses

Sr. No.	Course Code	Name of Course	CO	Course Outcome Statment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	BTBS101	Engineering Mathematics- I BTBS101	CO 1	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem.	3	----	----	----	----	----	----	----	----	----	----	1			
			CO 2	Demonstrate the concept and use of partial differentiation in various problems.	3	2	----	----	----	----	----	----	----	----	----	1			
			CO 3	Compute Jacobian of functions of several variables and their applications to engineering problems	3	2	----	----	----	----	----	----	----	----	----	1			
			CO 4	Identify and sketch of curves in various coordinate system	3	1	----	----	----	----	----	----	----	----	----	1			
			CO 5	Evaluate multiple integrals and their applications to area and volume.	3	2	----	----	----	----	----	----	----	----	----	1			
2	BTBS102/202	Engineering Physics BTBS102/202	CO 1	Apply the concept of types of Oscillation & ultrasonic	2	1	1	----	1	----	----	----	----	----	----	----			
			CO 2	Implement the knowledge Interference, Polarization of light ,working Principle of Lasers & Fiber optics	2	1	1	----	1	----	----	----	----	----	----	----			
			CO 3	Apply the principle of motion of charged particles in EF&MF, Bainbridge Mass spectrograph, G M counter and quantum Mechanics	2	2	----	----	1	----	----	----	----	----	----	----			
			CO 4	Identify Types of crystals & crystal planes using Miller indices, Experimental approach for crystal determination	2	1	1	----	1	----	----	----	----	----	----	----			
			CO 5	Incorporate the concepts of types of magnetic, semiconducting and superconducting materials.	2	1	1	----	1	----	----	----	----	----	----	----			
3	BTES103/203	Engineering Graphics BTES103/203	CO 1	Use the drawing instruments & drawing standards effectively for drawing and dimensioning and to draw basic geometrical constructions.	1	----	----	----	----	---	----	----	----	----	----	----			
			CO 2	Construct orthographic views of given objects, project points on different planes.	3	----	----	----	3	----	----	----	----	----	----	----			
			CO 3	Apply concept of projections of lines, planes	----	----	----	----	----	---	----	---	----	----	----	----			
			CO 4	Apply concept of projections of solids	3	----	----	----	----	----	----	----	----	----	----	----			

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			CO 5	Construct section of solids and isometric views of given objects	3	----	----	----	3	----	----	----	----	----	----	----			
4	BTHM104/204	Communication Skills BTHM104/204	CO 1	Apply speaking and writing skills in professional as well as social situations	----	----	----	----	----	----	----	----	----	3	----	----			
			CO 2	Overcome Mother Tongue Influence and demonstrate neutral accent while exercising English	----	----	----	----	----	----	----	----	----	3	----	2			
			CO 3	Apply communication skills for Presentations, Group Discussion and interpersonal interactions	----	----	----	----	----	----	----	---	2	3	1	----			
			CO 4	Apply grammar correctly during Speaking and Writing situations especially in context with Presentations, Public Speaking, Report writing and Business Correspondence	----	----	----	----	----	----	----	----	1	3	----	----			
5	BTES105/205	Energy and Environment Engineering BTES105/205	CO 1	Identify conventional ,non-conventional energy sources.	3	1	----	----	----	1	----	----	----	----	----	----			
			CO 2	Know and discuss power consuming and power developing devices for effective utilization and power consumption.	2	3	----	----	----	1	1	----	----	----	----	----			
			CO 3	identify various sources of air, water pollution and its effects.	----	1	----	----	----	1	2	----	----	----	----	----			
			CO 4	Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste.	----	1	----	----	----	1	2	----	----	----	----	----			
6	BTES106 /206	Basic Civil and Mechanical Engineering BTES106 /206	CO 1	Identify various Civil Engineering materials and choose suitable material among various options.	3	----	----	----	----	---	----	----	----	----	----	----			
			CO 2	Apply principles of surveying to solve engineering problem	1	----	----	----	----	----	----	----	----	----	----	----			
			CO 3	Identify various Civil Engineering structural components and select appropriate structural system among various options	2	----	----	----	----	---	----	---	----	----	----	----			
			CO 4	Explain and define various properties of basic thermodynamics, materials and manufacturing processes.	2	1	----	----	----	----	----	----	----	----	----	----			
			CO 5	Know and discuss the working principle of various power consuming and power developing devices	2	----	----	----	----	----	1	----	----	----	----	----			
7	BTBS107L/207L	Engineering Physics Lab BTBS107L/207L	CO 1	Understanding the fundamental principles of optics, Laser and fiber optics based on phenomenon like interference, polarization and diffraction	3	2	1	----	----	----	----	----	----	----	----	----			
			CO 2	Demonstrating the experiments based on electricity,magnetism and material science.	3	2	1	----	----	----	----	----	----	----	----	----			
			CO 3	Analyse experimental data from graphical representations and to represnet effectively in Laboratory reports including innovative experiments.	1	2	1	----	----	----	----	----	----	----	----	----			
8	BTES108L/208L	Engineering Graphics Lab BTES108L/208L	CO 1	Apply the fundamental principles of engineering Graphics to create engineering drawings of various geometric constructions, engineering scales adhering to BIS standards.	1	----	----	----	----	----	----	----	----	----	----	2			
			CO 2	Generate orthographic projections, Front view, Top view, side views of points, lines, planes and solids in both 1st angle projection method	3	----	----	----	3	----	----	----	----	----	----	----			
			CO 3	Generate the sections of solids.	3	----	----	----	----	----	----	----	----	----	----	----			
			CO 4	Develop isometric projection, convert orthographic views to isometric views and vice versa for practical engineering problems.	3	----	----	----	3	----	----	----	----	----	----	----			

9	BTHM109L/209L	Communication Skills Lab. BTHM109L/209L	CO 1	Develop the ability to plan and deliver the well-argued presentation GD & interviews etc.	----	----	----	----	----	----	----	----	----	3	----	----			
			CO 2	Overcome language barriers & use correct grammar for effective communication	----	----	----	----	----	----	----	----	----	3	----	2			
			CO 3	Understand appropriate corporate manners & etiquettes	----	----	----	----	----	----	----	---	2	3	----	----			
			CO 4	Identify and control behavioural aspects in organisation	----	----	----	----	----	----	----	---	2	3	----	----			
10	BTBS201	Engineering Mathematics-II BTBS201	CO 1	Discuss the need and use of complex variables to find roots, to separate complex quantities and to establish relation between circular and hyperbolic functions.	3	1	----	----	----	----	----	----	----	----	----	1			
			CO 2	Solve first and higher order differential equations and apply them as a mathematical modeling in electric and mechanical systems.	3	1	----	----	----	----	----	----	----	----	----	1			
			CO 3	Solve linear differential equations and apply them as a mathematical modeling in electric and mechanical systems.	3	2	----	----	----	----	----	----	----	----	----	1			
			CO 4	Determine Fourier series representation of periodic functions over different intervals	3	2	----	----	----	----	----	----	----	----	----	1			
			CO5	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence & curl in various engineering streams and also use the principles of vector integration to transform line integral to surface	3	2	----	----	----	----	----	----	----	----	----	1			
11	BTBS102/202	Engineering Chemistry BTBS102/202	CO 1	Differentiate hard & soft water; understand different softening method ,solve the related numerical problems	2	2	----	----	----	----	----	----	----	----	----	----			
			CO 2	Implement Phase rule in one & two component system	2	----	----	----	----	----	----	----	----	----	----	----			
			CO 3	Understand the cause of corrosion, its consequences & methods to minimize corrosion to improve industrial design	2	2	----	----	----	----	----	----	----	----	----	----			
			CO 4	Explain the properties, separation techniques of crude oil along with potential application & role of petrochemical in national economy	----	----	----	----	----	----	2	----	----	----	----	----			
			CO 5	Demonstrate knowledge of different instruments in technical field	2	----	----	----	----	----	----	----	----	----	----	----			
12	BTES103/203	Engineering Mechanics BTES103/203	CO 1	Apply fundamental Laws of Engineering Mechanics	2	----	----	----	----	----	----	----	----	----	----	----			
			CO 2	Apply Conditions of static equillibrium to analyze given force system	1	2	----	----	----	----	----	----	----	----	----	----			
			CO 3	Computee centre of gravity and moment of interia of plane surfaces	----	2	----	----	----	----	----	----	----	----	----	----			
			CO 4	Compute the motion characteristics of a body/particle for a rectilinear and curvilinear motion	1	2	----	----	----	----	----	----	----	----	----	----			
			CO5	Know and discuss relation between force and motion characteristics	2	1	----	----	----	----	----	----	----	----	----	----			
			CO 1	Analyse broad perspective about the uses of computers in engineering industry and C Programming	3	1	1	1	----	----	----	----	----	----	----	----			
			CO 2	Identify and develop the basic concept of algorithm, algorithmic thinking and flowchart	3	2	2	2	----	----	----	----	----	----	----	----			

13	BTES104/204	Computer Programming in C BTES104/204	CO 3	Create variable, keywords and different types of operators	3	2	3	3	----	----	----	----	----	----	----					
			CO 4	Demonstrate programs using c programming concept like loops.control statements and array	3	2	2	2	----	----	----	----	----	----	----	----				
			CO 5	Verify tasks in which the pointers are applicable and apply them to write programs and hence use computers effectively to solve the task.	3	2	2	2	----	----	----	----	----	----	----	----				
14	BTES105/205	Workshop Practices BTES105/205	CO 1	Build thorough knowledge of various tools, machines, devices used in engineering practice	**2**					**2**			**1**			**1**				
			CO 2	Summarize thorough knowledge of carrying out various operations in mechanical engineering workshop	**2**								**1**			**2**				
			CO 3	Utilize measuring skills and practical skills gained in the workshop practice	**2**	**2**							**1**			**1**				
			CO 4	Demonstrate "Hands on" training to use of various tools, devices and machines	**2**								**2**			**1**				
			CO 5	Acquire skills in basic engineering practice for creating objects from raw materials	**1**	**2**				**2**			**2**			**2**				
15	BTES106/206	Basic Electrical and Electronics Engineering BTES106/206	CO 1	Apply basic ideas and principles of electrical engineering	3	--	--	--	--	--	--	--	--	--	--	--				
			CO 2	Identify protection equipment and energy storage devices.	--	2	--	--	--	--	--	--	--	--	--	--				
			CO 3	Differentiate electrical and electronics domains and explain the operation of diodes and transistors	2	--	--	--	--	--	--	--	--	--	--	--				
			CO 4	Acquire knowledge of digital electronics.	3	--	--	--	--	--	--	--	--	--	--	--				
			CO5	Design simple combinational and sequential logic circuits.	--	--	2	--	--	--	--	--	--	--	--	--				
16	BTBS107L/207L	Engineering Chemistry Lab BTBS107L/207L	CO 1	Understand different techniques of quantitative chemical analysis to generate experimental skills	3	2	--	1	--	--	2	--	1	--	--	1				
			CO 2	Apply instrumental techniques for chemical analysis	3	2	--	1	--	--	--	--	1	--	--	1				
			CO 3	Evaluate accurate results from experiment procedure & represent effectively in laboratory reports including innovative experiments	2	3	--	1	--	--	--	--	1	--	--	1				
			CO 4	Analyse different properties of lubricant for selection of good lubricant	3	3	--	1	--	--	--	--	1	--	--	1				
17	BTES108L/208L	Engineering Mechanics Lab BTES108L/208L	CO 1	Apply the fundamental laws of Engineering Mechanics	3	3	--	--	--	--	--	--	--	--	--	--				
			CO 2	Apply condition of static equilibrium to analyze given force system	3	2	--	--	--	--	--	--	--	--	--	--				
			CO 3	Compute centre of gravity and moment of inertia of plane surfac	3	--	--	--	--	--	--	--	--	--	--	--				
			CO 4	Know and discuss relation between force and motion characteristics	3	--	--	--	--	--	--	--	--	--	--	--				

18	BTES110S/210S	Seminar BTES110S/210S	CO 1	Establish motivation for any topic of interest and develop a thought process for technical presentation	1	1	--	1			1													
			CO 2	Organize a detailed literature survey and build a document with respect to technical publications	1	3		1		1	1													
			CO 3	Analysis and comprehension of proof-of-concept and related data		2			1															
			CO 4	Effective presentation and improving soft skills								1	1	3										
			CO 5	Make use of new and recent technology for creating technical reports					2	1						1								
19	BTBS301	Engineering Mathematics-III	CO1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.	3	2	_	_	_	_	_	_	_	_	_	_	1	_	-					
			CO2	Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.	3	2	_	_	_	_	_	_	_	_	_	_	1	_	-					
			CO3	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.	3	2	_	_	_	_	_	_	_	_	_	_	1	_	-					
			CO4	Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.	3	2	_	_	_	_	_	_	_	_	_	_	1	_	-					
			CO5	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal	3	2	_	_	_	_	_	_	_	_	_	1	1	_						
20	BTMC302	Fluid Mechanics	CO1	Calculate various properties of fluid.	3	3	2	2	_	_	_	_	_	_	_	1	2	1	-					
			CO2	Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies.	3	3	1	1	_	_	_	_	_	_	_	1	1	1	-					
			CO3	Calculate Velocity and acceleration of fluid particles	3	3	1	1	_	_	_	_	_	_	_	1	1	1	-					
			CO4	Apply Bernoulli's equation to simple problems in fluid mechanics	3	3	_	_	_	_	_	_	_	_	_	1	1	1	-					
			CO5	Analyse the behaviour of laminar and turbulent flows through circular pipe and two parallel plates.	3	3	_	_	_	_	_	_	_	_	_	1	1	1	-					
			CO6	Apply dimensional analysis to simple problems in fluid mechanics	2	3	_	_	_	_	.	_	_	_	_	1	1	1	-					
			CO7	Apply impulse momentum equation to centrifugal pump.	2	3	_	_	_	_	------ ------	_	_	_	_	1	2	1	-					
21	BTMC303	Thermodynamics	CO1	Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics.	1	1	_	_	_	_	_	_	_	_	_	_	1	2	-					
			CO2	Studied different laws of thermodynamics	1	2	1	_	_	_	_	_	_	_	_	_	1	-	-					
			CO3	Studied Entropy, application and disorder.			1	_	_	_	_	_	_	_	_	_	1	1	-					
			CO4	Studied various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes.	2	_		_	_	_	_	_	_	_	_	_	1	2	-					

			CO5	Represent phase diagram of pure substance (steam) on different thermodynamic planes like p-v, T-s, h-s, etc. Show various constant property lines on them.	1	1	_	_	_	_	_	_	_	_	_	_	_	1	2	-
22	BTMES304	Materials Science and Metallurgy	CO1	Study various crystal structures of materials and Understand mechanical properties of materials and calculations of same using appropriate equations.	2	2	1	_	_	_	_	_	_	_	_	_	_	1	1	0
			CO2	Evaluate phase diagrams of various materials	3	2	2	3	2	_	_	_	_	_	_	_	_	0	0	0
			CO3	Suggest appropriate heat treatment process for a given application	2	1	2	1	1	_	_	_	_	_	_	_	_	0	2	0
			CO4	Prepare samples of different materials for metallography	1	2	2	1	2	1	2	1	1	1	-	_		2	2	0
			CO5	Recommend appropriate NDT technique for a given application	1	1	1	3	2	_	1	_	1	_	_	_		0	0	0
23	BTMCL305	Machine Drawing and CAD Lab	CO1	Interpret the object with the help of given sectional and orthographic views.	2	_	_	_	_	_	_	_	3	2	_	1		1	1	-
			CO2	Construct the curve of intersection of two solids	2	1	_	_	_	_	_	_	2	1	_	1		1	1	-
			CO3	Draw machine element using keys, cotter, knuckle, bolted and welded joint	2	_	_	_	_	_	_	_	2	1	_	_		2	1	-
			CO4	Assemble details of any given part. i. e. valve, pump , machine tool part etc.	2	2	_	_	1	_	_	_	2	1	_	1		2	1	-
			CO5	Represent tolerances and level of surface finish on production drawings	1	1	_	_	1	_	_	_	2	1	_	1		1	1	-
			CO6	Understand various creating and editing commands in Auto Cad	1	1	_	_	1	_	_	_	2	2	_	1		1	1	-
24	BTMCL306 A	Fluid Mechanics Lab	CO 1	Understand working of pressure measuring device	---	---	---	---	1	---	----	----	----	----	----	1		1	----	2
			CO 2	Analyze metacentre of floating body and determine metacentric height.	2	1	----	1	----	----	----	----	----	----	----	----		----	1	2
			CO 3	Differentiate flow through pipe using the non-dimensional Reynold's number	2	----	----	2	----	---	----	---	----	----	----	----		----	----	0
			CO 4	Verify and Apply Bernoulli's theorem to flow measuring device	2	2	----	2	----	----	----	----	----	----	----	1		1	----	1
25	BTMCL306 B	Material Science and Metallurgy Lab	CO 1	Understand various mechanical testing of the materials.	2	1	----	2	----	----	----	----	----	----	----	----		----	----	2
			CO 2	Calculate the hardness of the given material.	2		----	2	----	---	----	---	----	----	----	----		----	----	2
			CO 3	Prepare specimen for macroscopic and microscopic analysis and draw microstructure.		2	----	2	----	----	----	----	----	----	----	----		----	----	2
			CO 4	Study and use of Non -destructive testing.	2		1	2	1	1-	----	----	----	----	----	----		----	----	2

26	BTES209P	Internship Evaluation I	CO 1	Associatewith the professional world for understanding workplace behaviour, operating procedures, department/company wise products, and other organizational concepts	1	1	1	-	-	-	-	-	-	1	-	-	2	2	1
			CO 2	Demonstrateinterests and abilities in their field of Mechanical Engineering for exposure to the current technological developments.	-	-	-	1	-	-	-	-	1	2	2	-	2	2	1
			CO 3	Apply the technical knowledge in real industrial situations for improving skills, confidence and competency in Mechanical Engineering	-	1	-	-	-	1	-	1	-	-	-	-	2	2	1
			CO 4	Developto learn new skills and supplementary knowledge and strategies like time management, multi-tasking etc. in the industrial set-up	-	-	3	2	2	-	1	-	1	1	1	1	2	2	1
27	BTMCL401	Manufacturing Processes-I	CO1	Analyze castings processes, working principles and applications and list various defects in metal casting	1	1	1	_	1	1	_	_	_	1	_	1	1	2	-
			CO2	Analyze the various metal forming processes, working principles and applications	2	2	1	_	1	1	_	_	_	1	_	1	1	1	-
			CO3	Describe the basic joining processes and demonstrate principles of welding, brazing and soldering.	2	1	1	_	1	1	_	_	_	1	_	1	1	2	-
			CO4	Analyze center lathe and its operations including plain, taper turning, work holding devices and cutting tool.	1	_	1	_	1	1	_	_	_	1	_	1	1	2	-
			CO5	Analyze milling machines and operations, cutters and indexing for gear cutting.	2	_	1	_	1	1	_	_	_	1	_	1	1	1	----
			CO6	Apply the knowledge of shaping, planning and drilling, their types and related tooling's	1	_	_	_	1	1	_	_	_	1	_	1	1	1	-
28	BTMC402	Theory of Machines-I	CO1	Define basic terminology of kinematics of mechanisms	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0
			CO2	Classify planar mechanisms and calculate its degree of freedom	0	0	0	1	0	0	0	0	0	0	0	3	2	0	0
			CO3	Perform kinematic analysis of a given mechanism using ICR and RV methods	1	1	0	2	0	0	0	0	0	0	0	3	0	1	0
			CO4	Introduction of different types of lubrication system.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			CO5	Perform kinematic analysis of slider crank mechanism using Klein's construction andanalytical approach	1	1	0	3	0	0	0	0	0	0	0	2	0	0	1
			CO6	Perform balancing of unbalance forces in rotating masses, different types of single/multicylinder reciprocating engines in different positions	1	1	0	0	0	0	0	0	0	0	0	2	0	0	0
29	BTMC403	Basic Human Rights	CO1	Know the history of human rights.	_	_	_	_	_	2	_	2	_	_	_	_	1	-	
			CO2	Learn to respect others caste, religion, region and culture	_	_	_	_	_	_	_	3	_	_	_	_	1	1	
			CO3	Be aware of their rights as Indian citizen and Make them aware of their responsibilities towards the nation				_	_	_	_	_	2	_	_	_	2	-	1	
			CO4	Realize the importance of groups and communities in the society	_	_		_	_	_	_	_	_	2	2	_	1	-	

			CO5	Realize the philosophical and cultural basis and historical perspectives of human rights.	_	_	_	_	_	1	_	2		1	_	_	-	-					
30	BTMES404	Strength of Materials	CO1	State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ, etc.	1	1	-	1	_	_	_	1	_	_	_	2	**2**	**1**	**0**				
			CO2	Recognize the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases.	1	1	2	2	_	_	_	_	_	_	_	2	**2**	**2**	**2**				
			CO3	Distinguish between uniaxial and multiaxial stress situation and calculate principal stresses, max. Shear stress, their planes and max. Normal and shear stresses on a given plane.	1	1	2	2	_	1	_	_	_	_	_	3	**2**	**2**	**0**				
			CO4	Analyze given beam for calculations of SF and BM	1	3	2	1	_	_	_	_	_	_	_	2	**2**	**2**	**1**				
			CO5	Calculate slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition methods	1	1	2	3	_	_	_	_	_	_	_	2	**2**	**2**	**1**				
31	BTMPE405A	Numerical Methods in Mechanical Engineering	CO1	Describe the concept of error	3	3	_	1	3	_	_	_	_	_	_	_	1	1	_				
			CO2	Illustrate the concept of various Numerical Techniques	3	3	_	1	3	_	_	_	_	_	_	_	1	1	_				
			CO3	Evaluate the given Engineering problem using the suitable Numerical Technique	3	3	_	1	3	_	_	_	_	_	_	_	1	1	_				
			CO4	Develop the computer programming based on the Numerical Techniques	3	3	_	1	3	_	_	_	_	_	_	_	1	1	_				
32	BTMCL406 A	Manufacturing Processes Lab I	CO1	Perform plain turning, step turning, knurling, eccentric turning, chamfering and facing operations on lathe.	1	1	_	3	1	_	1	_	1	2	_	1	**1**	**1**	-				
			CO2	Demonstrate the setup and fabricate composite job using milling, shaping and drilling machine.	1	1	_	3	1	_	1	_	1	2	_	1	**1**	**2**	-				
			CO3	Perform spur gears cutting on a milling machine.	1	1	_	3	1	_	1	_	1	2	_	1	**1**	**1**	-				
33	BTMCL406 B	**Theory of Machines Lab -I**	CO1	Perform graphically kinematic analysis of any planar mechanism using ICR and RV methods.	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_				
			CO2	Perform graphically kinematic analysis of slider crank mechanism using Klein's construction.	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_				
			CO3	Demonstrate use of graphical differentiation method for kinematic analysis of slider crank mechanism or any other planar mechanism with a slider.	1	1	1	1	1	1	1	1	1	1	1	1	1	_	_				
			CO4	Sketch polar diagram for a Hooke's joint	1	1	1	1	1	1	1	1	1	1	1	1	_	_	_				
			CO5	.Verification of principle of gyroscope and gyroscopic couple using motorized gyroscope	1	1	1	1	1	1	1	1	1	1	1	1	1	_	_				
34	BTMCL406 C	**Strength of Materials Lab**	CO1	Apply Graphical solution method for principal stress problems			2		_	_	_	1	_	_	_	_	**0**	**1**	**1**				
			CO2	Demonstrate Compression test on mild steel, aluminum, concrete and wood	1	1	2	2	_	_	_	_	_	_	_	2	**0**	**1**	**1**				

			CO3	Demonstrate Impact test on mild steel, brass, aluminum, and cast-iron specimens	1	1	2	2	_	_	_	_	_	_	_	2	**0**	**1**	**1**
35	BTMEC501	Heat Transfer	CO1	Explain the laws of heat transfer and deduce the general heat conduction equation and to explain it for 1-D steady state heat transfer in regular shape bodies	2	1	_	_	1	_	_	_	1	_	_	_	**1**	**1**	**0**
			CO2	Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer	3	2	_	_	1	_	_	_	_	_	_	_	**1**	**1**	**2**
			CO3	Interpret the extended surfaces	3	1	_	_	2	_	2	_	1	_	_	_	**1**	**1**	**0**
			CO4	Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions	3	3	_	1	1	_	_	_	1	_	_	_	**2**	**2**	**3**
			CO5	Describe the Boiling heat transfer, Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems	3	3	3	_	1	_	2	_	_	_	_	_	**2**	**2**	**3**
			CO6	Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields	2	3	_	2	2	_	2	_	1	_	_	_	**2**	**2**	**0**
36	BTMEC502	Applied Thermodynamics - I	CO1	Define the terms like calorific value of fuel, stoichiometric air-fuel ratio, excess air,equivalent evaporation, boiler efficiency, etc. Calculate minimum air required for combustion of fuel.	1	1	_	_	_	_	_	_	_	_	_	_	**1**	**1**	**0**
			CO2	Studied and Analyze gas power cycles and vapour power cycles and derive expressions for the performance parameters like thermal efficiency.	1	2	_	_	_	_	_	_	_	_	_	_	**1**	**2**	**0**
			CO3	Classify various types of boilers, nozzle, steam turbine and condenser used in steam power plant.	1	_	_	_	_	_	_	_	_	_	_	_	**1**	**2**	**0**
			CO4	Classify various types condenser, nozzle and derived equations for its efficiency.	1	_	1	_	1	_	_	_	_	_	_	_	**0**	**1**	**0**
			CO5	Draw P-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating and rotary air compressors.	_	2	_	_	_	_	_	_	_	_	_	_	**0**	**1**	**0**
37	BTMC503	Machine Design - I	CO1	Formulate the problem by identifying customer need and convert into design Specification	1	1	_	_	_	_	_	1	_	_	_	1	**0**	**0**	**0**
			CO2	Understand component behavior subjected to loads and identify failure criteria	3	2	_	1	_	2	_	1	_	1	_	1	**0**	**0**	**0**
			CO3	Analyze the stresses and strain induced in the component	1	1	_	_	_	2	_	1	_	1	_	1	**0**	**0**	**0**
			CO4	Design of machine component using theories of failures	3	3	2	1	_	2	_	1	_	1	_	1	**1**	**0**	**1**
			CO5	Design of component for finite life and infinite life when subjected to fluctuating load	1	1	_	_	_	2	_	1	_	1	_	1	**0**	**0**	**0**
			CO6	Design of components like shaft, key, coupling, screw and spring	2	2	2	1	_	2	_	1	_	1	_	1	**1**	**0**	**1**
			CO1	Identify and select type of belt and rope drive for a particular application	3	1	_	2	_	1	_	_	2	_	2	**1**	**0**	**0**
			CO2	Evaluate gear tooth geometry and select appropriate gears, gear trains	2	3	_	_	_	_	1	_	_	_	3	**1**	**0**	**0**

38	BTMEC504	Theory of Machines - II	CO3	Define governor and select/suggest an appropriate governor	_	2	_	_	_	_	_	_	_	_	_	2	**0**	**0**	**0**
			CO4	Characterize flywheels as per engine requirement	_	2	_	1	_	_	_	_	_	_	_	_	**1**	**1**	**0**
			CO5	Understand gyroscopic effects in ships, aero planes, and road vehicles.	2	3	_	2	_	_	_	_	_	_	_	3	**0**	**0**	**0**
			CO6	Understand free and forced vibrations of single degree freedom systems	2	3	_	3	_	_	_	_	_	_	_	3	**0**	**0**	**1**
39	BTMEC505	Metrology and Quality Control	CO1	Apply the methods and instruments for Linear and angular measurements considering the different errors in measurement.	2	1	1	2	-	-	1	-	-	1	1	1	**2**	**2**	**1**
			CO2	Analyse methods and gauges for measurement using interferometry, surface finish and geometric/form tolerances.	2	2	-	2	-	-	2	-	-	1	1	1	**2**	**2**	**1**
			CO3	Summarize the methods and instruments for Gear measurements and advances in metrology using modern machines.	2	1	-	2	2	-	-	-	-	1	1	2	**1**	**1**	**3**
			CO4	Interpret the product/service quality using concepts as quality, cost of quality and different tools.	1	1	-	1	-	-	2	-	-	1	2	0	**1**	**1**	**-**
			CO5	Predict the effective measures for enhancement in product/service quality and reduction in cost by using quality control charts and different statistical tools	1	1	-	2	-	-	2	-	-	1	1	1	**1**	**1**	**-**
40	BTID506	Product Design Engineering - II	CO1	Create Prototypes using design automation	3	3	3	_	2	_	_	_	_	_	_	_	**1**	**1**	_
			CO2	Test the the prototypes using product architecture.	2	_	2	3	_	_	_	_	_	_	_	_	**1**	_	**1**
			CO3	Understand Product Life Cycle Management.	_	_	_	_	_	_	_	_	2	1	1	2	**1**	**2**	**1**
41	BTMEC506A	Automobile Engineering	CO1	Identify the different parts of the automobile.	2	1	_	_	1	_	_	_	1	_	_	_	**1**	**0**	**0**
			CO2	Explain the working of various parts like engine, transmission, clutch, brakes etc.,	3	2	_	_	1	_	_	_	_	_	_	_	**1**	**0**	**0**
			CO3	Demonstrate various types of drive systems; front and rear wheels, two and four wheel drive	3	1	_	_	1	_	2	_	1	_	_	_	**1**	**0**	**0**
			CO4	Apply vehicle troubleshooting and maintenance procedures.	3	3	_	1	2	_	_	_	1	_	_	_	**1**	**0**	**0**
			CO5	Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications.	2	3	3	_	1	_	2	_	_	_	_	_	**1**	**2**	**0**
			CO6	Evaluate future developments in the automobile technology	2	3	-	2	2	_	2	_	1	_	_	_	**1**	0	**1**
42	BTMCL 507	Heat Transfer Lab	CO1	Understand the various heat transfer mode of heat transfer and its application and verify	2	3	_	3	2	_	_	_	_	_	_	_	**2**	**1**	**1**
			CO2	Learn the experimental methodology	3	3	_	3	2	_	2	_	_	_	_	_	**2**	**2**	**1**
			CO3	Describe the concept the terms like least count, calibration of the instruments	3	3	_	3	2	_	2	_	_	_	_	_	**2**	**2**	**1**

43	BTMCL 507	Applied Thermodynamics Lab	CO1	Conduct test on Bomb calorimeter, nozzle, steam turbine, condenser, compressor etc. to study their performance.	1	_	_	2	_	_	_	_	_	_	_	_	**1**	**1**	**-**
			CO2	Draw performance curves of these machines.	2	1	_	1	_	_	_	_	_	_	_	_	**1**	**-**	**-**
			CO3	Analyze the results obtained from the tests.	1	2	1	2	1	1	_	_	_	_	_	_	**1**	**1**	**-**
			CO4	Draw conclusions based on the results of the experiments	_	_	_	2	_	_	_	_	_	_	_	_	**1**	**-**	**-**
			CO5	Based on your visit to Industry, sketch its layout and write specifications.	_	1	_	_	_	1	_	_	_	2	_	2	**1**	**1**	**-**
44	BTMCL 507	Machine Design Practice - I	CO1	Apply design process to an open ended problem	***1***	***1***	2	2	_	_	2	1	_	_	_	_	**0**	**0**	**0**
			CO2	Determine suitable material and **size for structural component** of machine/system	1	3	2	1	_	_	1	1	_	_	_	1	**1**	**0**	**0**
			CO3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing	3	2	2	1	_	_	1	1	_	_	_	1	**1**	**0**	**0**
			CO4	Choose logically and defend selection of design factors	2	2	2	2	_	_	1	1	_	_	_	1	**1**	**0**	**0**
			CO5	Design of components for given part/system i.e. shaft, keys, coupling, links, screws, springs etc.	3	3	2	1	_	_	2	1	_	_	_	1	**1**	**0**	**0**
			CO6	Work effectively as a part of design group/team	_	_	_	_	_	***2***	1	1	2	2	_	2	**1**	**0**	**0**
			CO7	Have good communication skill, orally, graphically as well as in writing	_	_	_	_	_	_	_	1	1	2	2	3	**0**	**0**	**0**
45	BTMEL510	Theory of Machines Lab -II	CO1	Explain various types of gear boxes, gear trains, belt and rope drives	2	2	1	2	2	_	2	_	_	_	_	_	**1**	**0**	**0**
			CO2	Interpreting physical principles and phenomenon of governor, gyroscopic, flywheel	2	2	1	2	2	_	_	_	_	_	_	3	**1**	**0**	**0**
			CO3	Measure vibration parameters in single degree of freedom systems	3	3	_	3	3	_	_	_	_	_	_	3	**0**	**1**	**0**
			CO4	Evaluating natural frequency of 1 dof	2	3	_	3	3	_	_	_	_	_	_	3	**0**	**1**	**0**
46	BTMI408 (IT – 2)	Internship Evaluation II	CO 1	Associatewith the professional world for understanding workplace behaviour, operating procedures, department/company wise	1	1	1	-	-	-	-	-	-	1	-	-	**2**	**2**	**1**
			CO 2	Demonstrateinterests and abilities in their field of Mechanical Engineering for exposure to the current technological developments.	-	-	-	1	-	-	-	-	1	2	2	-	**2**	**2**	**1**
			CO 3	Apply the technical knowledge in real industrial situations for improving skills, confidence and competency in Mechanical	-	1	-	-	-	1	-	1	-	-	-	-	**2**	**2**	**1**
			CO 4	Developto learn new skills and supplementary knowledge and strategies like time management, multi-tasking etc. in the industrial				3	2	2	-	1	-	1	1	1	1	**2**	**2**	**1**
			CO1	Associate with the grinding, its operations, machines and design condiderations,	2	2	1	2	2	-	-	-	-	1	1	1	**2**	**1**	**1**

47	BTMC 601	Manufacturing Processes - II	CO2	Calculate the cutting forces in orthogonal and oblique cutting	3	3	2	3	2	-	2	-	-	1	1	2	2	2	1
			CO3	Evaluate the machinability of materials	3	2	2	2	2	-	2	-	-	1	1	2	2	2	1
			CO4	Interpret the production, processing, operations and design considerations of powder metallurgy.	2	1	0	1	1	-	-	-	-	1	-	1	1	1	1
			CO5	Explain the processing of Ceramics, Glasses and Plastics	1	1	0	1	1	-	-	-	-	1	-	1	1	0	1
48	BTMC 602	Machine Design - II	CO1	Define function of bearing and classify bearings.	1	1	_	_	_	_	_	1	_	_	_	1	0	0	0
			CO2	Understanding failure of bearing and their influence on its selection.	3	2	_	1	_	2	_	1	_	1	_	1	0	0	0
			CO3	Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter.	1	1	_	_	_	2	_	1	_	1	_	1	0	0	0
			CO4	Select materials and configuration for machine element like gears.	3	3	2	1	_	2	_	1	_	1	_	1	0	0	0
			CO5	Design of elements like gears, belts for given power rating.	1	1	_	_	_	2	_	1	_	1	_	1	1	0	0
			CO6	Design thickness of pressure vessel using thick and thin criteria	3	2	2	1	_	2	_	1	_	1	_	1	1	0	0
49	BTMPE603	Applied Thermodynamics-II	CO1	Explain the functions of various parts of IC engine and the working and performance of IC engine through thermodynamic cycle	1	_	_	_	_	2	_	_	_	_	_	_	1	2	-
			CO2	Describe the various engine systems & identify methods for engines performance.		1	_	_	_	2	_	_	_	_	_	_	1	-	-
			CO3	Illustrate the fundamental principles and applications of refrigeration and obtain cooling capacity and coefficient of performance by conducting test			1	_	_	_	_	_	_	_	_	_	1	1	-
			CO4	Calculate cooling load for air conditioning systems used for various comfort and industrial air conditioning systems	1	1	_	_	_	_	_	_	_	_	_	_	1	2	-
			CO5	Describe and analyze different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation.	_	_	_	_	_	_	1	_	_	_	_	_	1	2	-
			CO6	Analyze the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts	_	_	_	_	_	_	1	_	_	_	_	2	1	-	-
50	BTMPE604B	IC Engines	CO1	Understand various types of I.C. Engines and Cycles of operation.	1	_	1	_	_	1	1	1	_	_	_	1	1	1	-
			CO2	Analyze the effect of various operating variables on engine performance	2	2	1	_	_	1	1	1	_	_	_	1	1	1	-
			CO3	Identify fuel metering and fuel supply systems for different types of engines	2	2	2	_	_	1	1	1	_	_	_	1	1	1	-
			CO4	Understand normal and abnormal combustion phenomena in SI and CI engines	2	2	2	_	_	1	1	1	_	_	_	1	1	1	-

			CO5	Evaluate performance Analysis of IC Engine and Justify the suitability of IC Engine for different application	2	2	1	_	_	1	1	1	_	_	_	1	1	1	2
			CO6	Understand the conventional and non-conventional fuels for IC engines and effects of emission formation of IC engines, its effects and the legislation standards	2	2	2	_	_	1	1	1	_	_	_	1	1	1	1
51	BTMEC605C	Renewable Energy Sources	CO1	Explain the difference between renewable and non-renewable energy	1	2	3	_	2	3	3	3	2	2	_	2	1	-	-
			CO2	Describe working of solar collectors	1	1	3	1	2	3	3	3	2	2	_	2	1	1	-
			CO3	Explain various applications of solar energy	2	1	1	_	_	_	3	2	_	1	_	2	1	1	-
			CO4	Describe working of other renewable energies such as wind, biomass , nuclear	3	3	_	_	2	3	3	2	_	_	_	1	1	1	-
52	BTMEC606C	Human Resource Management	CO1	Describe trends in the labor force composition and how they impact human resource management practice.	_	_	_	_	2	_	_	_	_	_	1	_	_	_	-
			CO2	Discuss how to strategically plan for the human resources needed to meet organizational goals and objectives.	_	_	_	_	_	_	_	_	_	_	3	_	_	_	_
			CO3	Define the process of job analysis and discuss its importance as a foundation for human resource management practice	_	_	_	_	_	_	_	_	_	2	_	_	_	_	1
			CO4	Explain how legislation impacts human resource management practice.	_	_	_	_	_	_	_	2	_	2	_	_	_	_	_
			CO5	Compare and contrast methods used for selection and placement of human resources.	_	_	_	_	_	_	_	_	2	3	_	_	_	_	_
			CO6	Describe the steps required to develop and evaluate an employee training program	_	_	_	_	_	_	_	_	_	1	_	3	_	_	_
			CO7	Summarize the activities involved in evaluating and managing employee performance.	_	_	_	_	_	_	_	_	_	2	2	_	_	_	1
			CO8	Identify and explain the issues involved in establishing compensation systems.	_	_	_	_	_	_	_	_	_	_	2	_	_	_	_
53	BTMEL607	Metrology and Quality Control Lab	CO 1	Measure linear, angular circular features, dimensional and geometric features	1	1	1	3	1	_	_	_	_	_	_	2	1	2	-
			CO 2	Measure surface roughness of components	_	_	2	2	_	1	_	1	_	_	_	2	1	2	-
			CO 3	Calibration of metrological equipment	_	_	3	2	_	1	_	_	_	_	_	2	1	1	-
54	BTMEL608	Machine Design Practice - II	CO 1	Apply design process to an open ended problems	1	1	2	2	_	_	2	1	_	_	_	_	1	0	0
			CO 2	Determine suitable material and size for structural component of machine/system	1	3	2	1	_	_	1	1	_	_	_	1	1	0	0
			CO 3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing	2	2	2	1	_	_	1	1	_	_	_	1	1	0	0
			CO 4	Choose logically and defend selection of design factors	2	2	2	2	_	_	1	1	_	_	_	1	1	0	0

			CO 5	Design of components for given part/system i.e shaft, keys, coupling, links, screws.	3	3	2	1	_	_	2	1	_	_	_	1	1	0	0
			CO 6	Work effectively as a part of design group/team	_	_	_	_	_	1	1	1	2	2	2	2	1	0	0
			CO 7	Have good communication skill, orally, graphically as well as in writing	_	_	_	_	_	_	_	1	1	2	2	3	0	0	0
55	BTMEL609	IC Engine Lab	CO 1	Conduct test on IC Engines to study their performance.	_	2	_	2	1	_	_	_	_	_	_	_	0	0	0
			CO 2	Draw performance curves of these machines/systems.	1	1	_	_	1	_	_	_	_	_	_	_	0	0	0
			CO 3	Analyse the results obtained from the tests.	_	1	_	_	1	_	_	_	_	_	_	_	2	0	0
			CO 4	Draw conclusions based on the results of the experiments	_	_	_	2	_	_	_	_	_	_	_	_	1	0	0
56	BTMEL610	Refrigeration and Air Conditioning Lab	CO 1	Conduct test on Refrigeration and air conditioning test units to study their performance.	_	2	_	2	1	_	_	_	_	_	_	_	1	2	0
			CO 2	Draw performance curves of these machines/systems.	1	1	_	_	1	_	_	_	_	_	_	_	2	2	0
			CO 3	Analyse the results obtained from the tests	_	1	_	_	1	_	_	_	_	_	_	_	1	2	0
			CO 4	Draw conclusions based on the results of the experiments	_	_	_	2	_	_	_	_	_	_	_	_	0	0	0
57	BTMEC701	Mechatronics	CO1	Define sensor, transducer and understand the applications of different sensors and transducers	1	1	1	3	2	_	_	_	2	1	_	1	2	1	1
			CO2	Explain the signal conditioning and data representation techniques	3	2	_	_	3	3	2	_	_	_	1	3	1	1	2
			CO3	Design pneumatic and hydraulic circuits for a given application	1	1	_	3	3	2	1	_	3	_	1	3	1	1	2
			CO4	Write a PLC program using Ladder logic for a given application	3	3	1	1	3	_	1	1	1	_	_	_	1	2	2
			CO5	Understand applications of microprocessor and micro controller	3	_	_	1	3	2	3	_	_	_	_	2	0	2	2
			CO6	Analyse PI, PD and PID controllers for a given application	_	3	3	_	3	3	1	1	3	_	_	2	2	2	2
58	BTMEC702	CAD/CAM	CO1	List and describe the various input and output devices for a CAD work station	3	2	_	_	_	_	_	_	_	_	_	_	2	1	-
			CO2	Carry out/calculate the 2-D and 3-D transformation positions (Solve problems on 2-Dand 3-D transformations)	3	_	1	_	2	_	_	_	_	_	_	1	2	1	-
			CO3	Describe various CAD modeling techniques with their relative advantages and limitations	1	_	1	_	_	_	_	_	_	_	_	1	2	1	-
			CO4	Develop NC part program for the given component, and robotic tasks		3	_	_	_	_	_	_	_	_	_	1	2	1	-

			CO5	Describe the basic Finite Element procedure,	1	1	3	_	1	_	_	_	_	_	_	1	2	1	-
			CO6	Explain various components of a typical FMS system, Robotics, and CIM	3	_	1	_	1	_	_	_	_	_	_	1	1	1	-
59	BTMEC703	Manufacturing Processes - III	CO1	Differentiate clearly between NC and CNC machines	1	1	1	_	_	_	_	_	_	_	_	_	1	2	1
			CO2	Develop a part program for producing a given product	1	1	_	_	1	_	_	_	_	_	_	_	1	1	-
			CO3	Categorize appropriate non-traditional machining process for a given applications.	2	2	2	_	_	_	_	_	_	_	_	_	1	2	1
			CO4	Distinguish different surface coating techniques.	2	2	1	_	_	1	1	_	_	_	_	1	1	2	2
			CO5	Describe different rapid prototyping techniques.	1	1	1	_	_	1	1	_	_	_	_	_	1	2	2
			CO6	Apply the working principle of various micro-manufacturing processes.	1	1	1	_	_	1	_	_	_	_	_	_	1	1	-
60	BTMEC704B	Industrial Engineering and Management	CO1	Impart fundamental knowledge and skill sets required in the Industrial Management and Engineering profession, which include the ability to apply basic knowledge of mathematics, probability and statistics, and the domain knowledge of Industrial Management and Engineering	1	-	-	1	1	-	-	-	-	1	2	2	2	2	2
			CO2	Produce ability to adopt a system approach to design, develop, implement and innovate integrated systems that include people, materials, information, equipment and energy.	2	1	1	1	1	-	-	-	-	1	1	1	2	2	2
			CO3	Understand the interactions between engineering, businesses, technological and environmental spheres in the modern society.	-	-	-	-	-	2	2	-	-	1	-	-	-	-	-
			CO4	Understand their role as engineers and their impact to society at the national and global context.	-	-	-	-	-	2	2	2	2	-	-	1	-	-	1
61	BTMEC705C	Wind Energy	CO1	Recognize historical applications of wind energy	_	_	_	_	_	_	2	2	2	1	_	1	1	1	-
			CO2	Explain wind measurements and wind data	_	3	2	1	3	2	2	2	2	_	_	1	1	1	1
			CO3	Determine Wind Turbine Power, Energy and Torque	3	3	1	1	2	2	1	_	_	_	_	1	1	2	1
			CO4	Explain Wind Turbine Connected to the Electrical Network AC and DC	3	3	_	1	_	_	_	_	_	_	_	1	1	1	-
			CO5	Recognize economics of wind energy.	3	2	1	_	_	_	_	_	_	_	_	1	1	1	-
62	BTMEL706	Manufacturing Processes-II Lab	CO1	Categorize types of chips based on materials.	2	1	1	2	1	2	2	1				1	1	-	-
			CO2	Develop manual part program of given component on CNC lathe and CNC milling using G and M codes and stock removal cycle.	2	1	2	1		1	1					1	1	1	1

			CO3	Develop a manual part program of a given component on CNC Lathe using canned cycle and Canned cycle and pocket milling cycle	2	1	1	1		1	1					1	1	2	1
63	BTMEL708	CAD/CAM Lab	CO1	Construct CAD part models, assembly model and drafting of machine elements using CAD software.	3	2	2	3	1	1	1	1				1	2	2	-
			CO2	Evaluate stresses in components subjected to simple structural loading using FE software	_	3	3	3	3	_	_	_	3	2	_	_	2	1	1
			CO3	Develop NC programs for turning and milling	_	1	2	1	3	_	_	_	3	2	_	_	2	1	1
			CO4	Develop case study of industrial robots	1	_	1	_	3	_	3	3	3	3	_	_	1	2	-
64	BTMES709	Seminar	CO 1	State the exact title of the seminar	2	-	-	-	-	2	2	2	2	1	-	1	1	1	-
			CO 2	Explain the motivation for selecting the seminar topic and its scope	-	-	-	-	-	-	-	2	-	2	-	1	-	1	-
			CO 3	Search pertinent literature and information on the topic.	2	-	-	-	-	1	1	1	3	3	-	3	1	1	-
			CO 4	Critically review the literature and information collected	2	-	1	-	-	2	1	2	2	2	-	2	-	1	-
			CO 5	Demonstrate effective written and verbal communication	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
65	BTMI609	Internship Evaluation III	CO 1	Associatewith the professional world for understanding workplace behaviour, operating procedures, department/company wise	1	1	1	-	-	-	-	-	-	1	-	-	2	2	1
			CO 2	Demonstrateinterests and abilities in their field of Mechanical Engineering for exposure to the current technological developments.	-	-	-	1	-	-	-	-	1	2	2	-	2	2	1
			CO 3	Apply the technical knowledge in real industrial situations for improving skills, confidence and competency in Mechanical	-	1	-	-	-	1	-	1	-	-	-	-	2	2	1
			CO 4	Developto learn new skills and supplementary knowledge and strategies like time management, multi-tasking etc. in the industrial	-	-	3	2	2	-	1	-	1	1	1	1	2	2	1
66	BTMEC801A	Fundamentals of Automotive systems	CO1	Describe the basic engine terminology, engine cycles, suoercharging, engine performance and combusion in I C engines	1	_	3	_	_	_	_	_	_	_	_	1	1	1	-
			CO2	Analyze various engine systems such as fuel supply, ignition, emission control etc.	2	_	3	_	2	_	2	_	_	_	_	1	1	1	-
			CO3	Analyze automotive systems such as transmission & brake systems.	1	_	3	_	_	_	_	_	_	_	_	1	1	1	-
			CO4	Analyze automative systems such as steering & suspension.	1	_	3	_	2	_	_	_	_	_	_	1	1	2	-
			CO5	Recognize electric & hybrid powertrain & tyre construction.	1	_	3	_	2	_	_	_	_	_	_	1	1	2	1
67	BTMEC801F	Non Conventional	CO1	Explain the difference between conventional & and non-conventional energy	1	2	3	_	2	3	3	3	2	2	_	2	1	1	-
			CO2	Describe working of solar collectors	1	3	1	2	3	3	3	2	2	_	2	1	1	-	

67		Energy Sources	CO3	Explain various applications of solar energy	2	1	1	_	_	_	3	2	_	1	_	2	1	-	-
			CO4	Describe working of other renewable energies such as wind, biomass	3	3	_	_	2	3	3	2	_	_	_	1	1	-	-
68	BTMEP711	**Project Stage - I**	CO1	State the exact title of the project and problem definition	1	1	-	-	-	-	-	-	-	1	-	-	2	2	1
			CO2	Explain the motivation, objectives and scope of the project	-	-	-	-	-	-	-	-	1	2	2	-	2	2	1
			CO3	Review the literature related to the selected topic of the project	-	1	-	-	-	1	-	-	-	-	-	-	2	2	1
			CO4	Design the mechanism, components of the system and prepare detailed drawings.	-	-	3	2	2	-	1	-	1	1	1	1	2	2	1
			CO5	Evaluate the cost considering different materials/manufacturing processes	1	-	1	-	-	-	-	1	-	-	2	1	2	2	1
69	BTMEP803	**Project Stage - II**	CO1	State the aim and objectives for this stage of the project.	1	1	-	-	-	-	-	-	-	-	-	-	2	2	1
			CO2	Construct and conduct the tests on the system/product.	-	-	2	2	2	1	1	-	-	-	-	-	3	2	1
			CO3	Analyze the results of the tests.	-	1	-	-	1	2		1	-	1	-	-	2	2	2
			CO4	Discuss the findings, draw conclusions, and modify the system/product, if necessary.	-	-	2	1	2	1	2	-	-	3	-	1	3	2	2

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