Name of the Department: Mechanical Engineering

BTPHXX-18 - Physics & Physics Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	7 P08	POg	9 PO1 0	1 PO1 1	1 PO1 2	1 Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
CO1: To be able to understand the basic principles of Quantum mechanics and to apply these to the complex phenomenon of matter radiation interaction	√		V		V		V	~	V	V	V	° √	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: To be able to understand the concept of wave packets using Heisenberg's uncertainty principle.			V		V		V	\checkmark	V	V	V	V	Understanding	y Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 3: To be able to apply Schrodinger's wave equations to study the complex physical phenomenon.	3		V		V		V	V	V	⁄ √	⁄ √	⁄ √	Understanding	g Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 4: To be able to understand the structure of crystalline solids by applying knowledge of crystallography.			V		V		V	∕ √		v		V	Understanding	g Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 5: To be able to understand semiconducting materials by using the concepts of band theory of solids.	~	×		′ √	/ /	/ /	/ √	/ /	⁄ √	/ √	/ √	/ /	Applying	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exam
BTAMXX-18 - Maths-1		HOR Departm LK C P Kapunt	PT thai	lechanic	al Engin Topus										

							•								
Course Outcome	P0 1	PO 2	PO 3	PO 4	РО 5	PO 6	P07	P08	PO9	P01 0	PO1 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1:Students will be able to remember terminologies and formulae in matrices, complex	V		V		V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Students will be able to understand and interpret the concepts of matrices, complex			V		V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO3:Students will be able to compare and analyze the methods in matrices, complex numbers	V	V	V	V	V	V	V	V	V	V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTEE101-18 Basic Electrical Eng	jineei	ring		_	Cepat LK.G	Noni di P.T.U ritale	Meci ne Necisia	ind Eng Gampi	ineering Is						
Course Outcome	PO 1	PO 2	PO 3	PO 4	РО 5	P0 6	P07	PO8	P09	PO1 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Have the knowledge of DC circuits, AC Circuits, basic magnetic circuits, working principles of electrical machines, and components of low voltage	V	V	V		V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 2: Be able to analyze of DC circuits, AC Circuits		√	~		V		•√	V	V	√	~	~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 3: Understand the basic magnetic circuits and apply it to the working of electrical machines		V	V		V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam

						h			T			Τ		1	
CO 4: Be introduced to types of wiring, batteries, and LT switchgear.		V	V		V		V	V		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTEE101-18 Basic Electrical Eng	jineer	rîng L	.ab			N.									
Course Outcome	PO 1	РО 2	PO 3	PO 4	PO 5	P0 6	P07	7 PO8	PO9	PO1 0	PO1 1	L PO1 2	L Skill	Focus on Employabilit y / Entrepreneu	Attainment of CO
CO1: The ability to use common electrical measuring instruments and understand the fundamentals of electrical engineering.	V	V	~		~		~	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: The ability to make electrical connections, and measure power, power factor using appropriate equipments.		V	~		~		V	~	V	V	V	 ✓ 	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam:
CO 3: Have the knowledge of electrical machines, components and their ratings		V	~		~		~	~	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 4: Understand the operation of transformers and electrical machines		V	~		~		~	V		V		V	Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exam
Paper BTME101-18 Engineering) Graț	phics	& Des	sign			12				Deparina I.K.G. I Kapurti	PTU	Mechanical Engineering		ал. С
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	7 PO8	PO9	DO1	P01 1		L Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO

V	V	V	V	V	~	V	V	V	V	V	V	Design	Yes	Minor Exams, Quiz, Assignments, Term Exams
V	V	V	V	V	V	V	V	V	V	V	V	Communicate	Yes	Minor Exams, Quiz, Assignments, Term Exams
V	V	V	V	V	V	~	V	V	V	V	V	Apply	Yes	Minor Exams, Quiz, Assignments, Term Exams
ofessi	onal	Devel	opme	ent	a.			1, <u> </u>	t	Separtin I.K.G.	ont of M P.T.U. T Inala	2.161		
PO 1	PO 2	PO 3	PO 4	РО 5	PO 6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu	Assessment Tools to Measu Attainment of CO
V	V	V		V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exam
	V	~		V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exam
	V	V		V		V	V	V	V	~	V	Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exam
														Minor Exams, Buisness Quiz
	√ √ v ofessi PO 1	√ √ √ √ √ √ PO PO 1 2 √ √ √ √ √ √ √ √ √ √	\checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark PO PO PO 1 2 PO \checkmark	\checkmark	\checkmark \bullet </td <td>\checkmark<</td> <td>\checkmark</td> <td>\checkmark</td> <td>\checkmark \checkmark \checkmark</td> <td>\checkmark \checkmark \checkmark</td> <td>\checkmark \checkmark \checkmark</td> <td> $$ $$</td> <td>\checkmark</td> <td>$\sqrt{1}$ $\sqrt{1}$ $\sqrt{1}$</td>	\checkmark <	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	$ $$	\checkmark	$\sqrt{1}$

BTCH101-18 - Chemistry -1

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	7 PO8	PO9	9 PO1 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.	V		~		√		V	~	√	~	~	~	Understanding		Minor Exams, Buisness Quiz, Assignments,End Term Exams
Rationalise bulk properties and processes using thermodynamic considerations.			~		V		~	~	~	V	~	~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.			~		√		~	~	~	~	~	~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.			V		~		V	~		V		~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
List major chemical reactions that are used in the synthesis of molecules.	V	V	V	V	~	~	~	~	~	~	~	~	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
BTCH102-18 - Chemistry Lab		-	HOX	annoni of G. P.T.	# Mecha	nical Er : Comp	ngineering pus								
Course Outcome	PO 1	РО 2	PO 3	PO 4	PO 5	PO 6	P07	7 PO8	PO9	P01 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO

 \bigcirc

Estimate rate constants of reactions from concentration of reactants/products as a function of time	V		V		V	5	V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water. etc			V		~		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Synthesize a small drug molecule and analyse a salt sample			V		~		V	\checkmark	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTAMXX-18 Mathematics II			-					IKG	P.T.U	Mechan Missio	Campi	inecting IS			
											1		1		
Course Outcome	P0 1	PO 2	РО 3	PO 4	PO 5	РО 6	P07	PO8	PO9	PO1 0	PO1 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu	Assessment Tools to Measu Attainment of CO
Course Outcome CO1: The mathematical tools needed in evaluating multiple integrals and their usages.							PO7	PO8	₽09				Skill Understanding	Employabilit y /	· · · · · · · · · · · · · · · · · · ·
CO1: The mathematical tools needed in evaluating multiple	1		3	4	5					0	1	2		Employabilit y / Entrepreneu rship	Attainment of CO Minor Exams, Buisness Quiz,

BTPS101-18 Programming for Problem Solving

Course Outcome	P0 1	P0 2	PO 3	PO 4	PO 5	P0 6	P07	PO8	PO9	P01 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
To formulate simple algorithms for arithmetic and logical problems.	V	V	V	V	V	V	V	V	√	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To translate the algorithms to programs (in C language).		V	V	V	V	V	V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To test and execute the programs and correct syntax and logical errors.		V	V	V	v	V	V	V	V	V	V	V	Underständing	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To implement conditional branching, iteration and recursion.		V	V		V	V		V		~		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To decompose a problem into functions and synthesize a complete program using divide and conquer approach.		V	V		V	V		V		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To use arrays, pointers and structures to formulate algorithms and programs.		V	~		C BERN		> of Mec	v vanical I in Can	inginee ipus			V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.		V	~			ovirtha √		V		v.,		~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.		V	V		V	V		V		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam

BTPS102-18 Programming for Problem Solving Lab

Course Outcome	PO 1	PO 2	PO _3	PO 4	PO 5	PO 6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Mease Attainment of CO
To formulate the algorithms for simple problems	~	~	~	V	V	V	V	V	V	\checkmark	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To translate given algorithms to a working and correct program	V	V	V	V	V	V	~	~	~	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
To be able to correct syntax errors as reported by the compilers	~	V	~	V	V	V	~	V	~	\checkmark	V	v	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to identify and correct logical errors encountered at run time	~	V	V	<u> </u>	× ₽	V		√		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to write iterative as well as recursive programs	~	V	~	Depa I.K.C Kapi	fiment o b. P.T. ! urthal:	f Mecha	nical En Camp	gineetin us√	0	V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to represent data in arrays, strings and structures and manipulate them through a program	~	V	V		V	V		~		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to declare pointers of different types and use them in defining self referential structures.	~	V	V		V	√		V		V		v	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

5

To be able to create, read and write to and from simple text files.	V	v √	~		V	1		~		V		~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Paper BTMP 101-18 Workshop/M	Manu	Jfactu	Iring (Practi	ices										
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	7 PO8	PO9	PO1 0	P01 1	L PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
CO1: gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different	V	~	~	V	~	V	V		-	~	V	~	Understanding		Minor Exams, Project based learn Assignments,End Term Exams
CO 2: able to fabricate components with their own hands.	√	V	√	V	V	V	V			V	√	V	Apply	Yes	Minor Exams, Project based learn Assignments,End Term Exam:
CO 3: Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.	~	~	V	~	~	V	~			~	V	V	Understanding	Yes	Minor Exams, Project based learn Assignments,End Term Exam
CO 4: By assembling different components, they will be able to produce small devices of their interest.	~	~	V	V	V	V	V			~		V	Apply	Yes	Minor Exams, Project based lean Assignments,End Term Exam
Paper BTHU101-18 English								ν.	IKC	C PT). A 39	nanical En In Gamp	ngineering pus		
Course Outcome	PO 1	PO 2					- 1 POZ	7 PO8	-	9 PO1 0		1 PO1 2	¹ Skill	Focus on Employabilit y / Entrepreneu rship	Assessment roots to Mease

V	V	V	V	√	√	~			V	V	V	() Understanding	Yes	Minor Exams, Project based learn Assignments,End Term Exams
V	V	V	V	V	V	~			V	v	V	Apply	Yes	Minor Exams, Project based learn Assignments,End Term Exams
V	√	V	~	V	V	V			V	V	V	Understanding	Yes	Minor Exams, Project based learn Assignments,End Term Exams
V	V	V	V	V	V	V			V		V	Apply	Yes	Minor Exams, Project based learn Assignments,End Term Exams
				C	eparium K.G. P.	ni of Me	<mark>dunia</mark> alo Ga	Engine mpus	sing					
				A	apurtin	ala:			1					
P0 1	P0 2	PO 3	РО 4	PO 5	PO 6		PO8	PO9		PO1 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
				PO	PO		PO8		P01			Skill Understanding	Employabilit y /	
1	2	3	4	PO 5	PO 6	P07	PO8		P01 0	1	2		Employabilit y / Entrepreneu rship	Attainment of CO Minor Exams, Project based learn
	√ √	 ✓ ✓ ✓ ✓ ✓ ✓ 	 ✓ ✓			$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c} & & & & & & & & & & & & & & & & & & &$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c cccccccccccc} & & & & & & & & & & & & & $	\checkmark	\checkmark

They will be able to converse fluently	V	V	V	V	V	↓	V			✓		V	Apply	Yes	Minor Exams, Project based learn Assignments,End Term Exams
BMPD101-18 Mentoring and pro	ofessi	onal	Devel	opme	ent										
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	P0 6	P07	PO8	PO9	PO1 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	V	V	~		~		V	~	~	V	~	~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.		V	~		~		~	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process engineering design and		V	~		~		V	~	√	~	~	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.		~	~		V		V	V		V		~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
Paper BTME301-18 Fluid Mecha	inics							[].K	20 epartmen K.G. P.1 lapurtha	nt of Med T.U. ala	hanical	l Engined mpus	Ning]		
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	B PO9	P01 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu	Attainment of CO

CO1: Understand the concept of fluids and their properties.	√	V	~		ζ	~	~		V	V		V	Understanding	Yes	Minor Exams, Quiz, Assignments Term Exams
CO 2: Apply the concept to solve the problems related to statics, dynamics and kinematics	~	V	√.			~	V		v	V		V	Understanding	Yes	Minor Exams, Quiz, Assignments Term Exams
CO3: Use and apply dimensional analysis and similitude techniques to various physical	~	~	~			~	~		V	V		V	Understanding	Yes	Minor Exams, Quiz, Assignments Term Exams
CO4: Distinguish various types of flows and learn flow measurement methods.	~	~	V			~	~		V	v		V	Analyse	Yes	Minor Exams, Quiz, Assignments Term Exams
BTME302-18 Theory of Machine	:s -1			C.	12			1 Panin	-						
				1	K.G. P.	TU.	e Iain Ca	d Engine ompus	Con U						
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	po7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
Course Outcome CO1: Understand constructional and working features of important machine elements.	1 1			PO	РО	PO		PO	PO				Skill Understanding	Employabilit y / Entrepreneu	Attainment of CO
CO1: Understand constructional and working features of important	1	2	3	PO 4	PO 5	PO 6		PO	PO 9		11	12		Employabilit y / Entrepreneu rship	Minor Exams, Assignments, End

CO4: Understand the function of brakes, dynamometers, flywheel and governors.	V	V	V	V	~	~		V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams
-													

BTME303-18 : Machine Drawing

Course Outcome	PO 1	PO 2	P0 3	P0 4	PO 5	РО 6	P07	7 PO 8	PO 9	PO 10			Chill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Read, draw and interpret the machine drawings and related parameters.	√.	V	V							~	~	V	Understanding		Minor Exams, Class and Home Assignments, End Term Exam
CO2: Use standards used in machine drawings of machine components and assemblies.	~	V	~							V	~		Applying	Yes	Minor Exams, Class and Home Assignments, End Term Exam
CO3: Learn the concept of limits, fits and tolerances in various mating parts.	~	~	V							\checkmark	~		Understanding	Yes	Minor Exams, Class and Home Assignments, End Term Exam
CO4: Visualize and generate different views of a component in the assembly.	V	~	~		~					V	~	~	Applying	Yes	Minor Exams, Class and Hom Assignments, End Term Exam
CO5: Use CAD tools for making drawings of machine components and assemblies.	~	~	~		~					V	~	~	Applying	Yes	Minor Exams, Class and Hom Assignments, End Term Exan
BTME304-18 STRENGTH OF MAT	TERI/	ALS-I		Î	LK.G.	fament of l 5. P.T .U. arthale	Mechani J. Water (ical Eng Social Pipi	igineering ous	£					

Course Outcome	P0 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	P0 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Understand the concepts of stress and strain at a point, in the members subjected to axial, bending, torsional loads and temperature changes.	V	V	V			V			V	~	V	~	Understanding	Yes	Minor Exams, Assignments, End T Exams
CO 2: Determine principal stresses, maximum shearing stress and their angles, and the stresses acting on any arbitrary plane within a structural element.	V	V	~			V			V	V	V	V	Understanding and Analysing	Yes	Minor Exams, Assignments, End T Exams
CO 3: Find bending moment and shear force over the span of various beams subjected to different kinds of loads.	V	V	V	2	V	V			V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End T Exams
CO 4: Calculate load carrying capacity of columns and struts and their buckling strength.	V	V	~		V	V			V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End ⁻ Exams
CO 5: Evaluate the slope and deflection of beams subjected to loads.	V	V	V		V	V			V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End Exams
BTME305-18 Basic Electronics I	ingine	eering	9		-	HOD DELKS		Mechan , Maán	Campi	inection					
Course Outcome	P0 1	PO 2	PO 3	PO 4	PO 5	PO 6	P0 7	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
Understand construction of diodes and their rectifier applications.	V	V	V			V			V	√	√	V	Understanding	Yes	Minor Exams, Assignments, End Exams

Appreciate the construction and working bipolar junction transistors and MOSFETs.	V	V	V	1	1		V	√ a	V	V	Understanding and Analysing	Yes	Minor Exams, Assignments, End T Exams
Design Op-Amp IC based fundamental applications.	V	V	V	V	V		V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End T Exams

Paper Basic Thermodynamics BTME 305-18

Course Outcome	PO 1	PO 2	PO 3	РО 4	PO 5	P06	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Apply energy balance to Systems and Control Volumes in situations involving heat and work interactions.	V	V	V		V		V	V	V	V	V		Applying	Yes	Minor Exams, Quiz, demonstrat through videos/ lab, End Term E
CO2: Evaluate changes in thermodynamic properties of substances		V	V	V	V				V		V	V	Applying	Yes	Minor Exams, Quiz, demonstrat through videos/ lab, End Term E
CO3:Evaluate performance of energy conversion devices		V	V	V	V				V		V	V	Applying	Yes	Minor Exams, Quiz, demonstrat through videos/ lab, End Term E
CO4:Explain and apply various gas power and vapor power cycles		V	V	V	V	V			V	V	V		Understanding	Yes	Minor Exams, Quiz, demonstrat through videos/ lab, End Term E
BTME306-18 Strength of Mater	ial La	b		The second secon		TU.U	<mark>chanica</mark> ain Ga	l Engine mpus	ering						

Course Outcome	PO 1	PO 2	PO 3	PO 4	РС 5	P0 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu	Attainment of CO
CO1: Measure the various mechanical properties such as tensile and compressive strength, impact strength, torsion strength and fatioue strength and hardness	~	~	~	~		~			~	~	V	~	Understanding	Yes	Quiz, Viva
CO 2: Calculate load carrying capacity of long columns and their buckling strength.	V	V	V	V		√		^	V	~	~	~	Understanding and Analysing	Yes	Quiz, Viva
BTME307-18 Theory of Machine	:s L ab	•													
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	РО 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu	Attainment of CO
CO1: Understand constructional and working features of important machine elements.	~	~	~	V	~	V			V		~	~	Understanding	Yes	Minor Exams, Assignments, End Exams
CO2: Design belt, rope and chain drives for transmission of motion from one shaft to															
another	V	~	~	~	~	~			~		~	V	Designing	Yes	Minor Exams, Assignments, End Exams
									-						1

-

profile for required follower motion.	V	V	v	V	V	V		V	ŝ	V	V	Designing	Yes	Minor Exams, Assignments, End Exams
CO4: Understand the function of brakes, dynamometers, flywheel and governors.	V	V	V	V	V	V		V		V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams

Paper BTME308-18 Fluid Mechanics Lab

Course Outcome	PO 1	PO 2				PO 6	P07	7 PO8	PO9	P01 0	. PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Distinguish various type of flows and flow measurement methods and concept of															
statics and dynamics of liquids.	V		×		V		V		~	V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 2: Determine discharge and head loss, hydraulic and friction coefficient, for different															
types of flow in pipe and open channels.							V		~	V		V	Analyse	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
BMPD301-18 Mentoring and pr	rofessi	ional	Deve	lopme	ent	T	HOD Departme I.K.Q. P Kepurt	ent of M	echanic	al Engin	eeting				

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rshin	Assessment Tools to Measu Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	V	V	V		V		V	~	V	~	~	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.		V	V		V		V	~	~	V	~	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process engineering design and		V	~		V		V	V	V	V	~	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.		•√	~		V		V	V		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
BTME401-18 APPLIED THERMO	DYNA	MICS	5	Catero a	pariment (.g. p.t.) LofMec LU, Ma	denial I ain Gen	Enginer mpus						· 6	
Course Outcome	PO 1 (En gine erin	ble	1 - 1	PO 4 (Co ndu	PO 5 (Mo der	PO 6 (Th e	(En	ics)	(Ind ivid		ject	e	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Explain the functioning and performance evaluation of reciprocating air compressors.	V		V	V	V	V	V		V	V		V	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO 2: Analyze the combustion phenomenon in boilers and I.C. engines.	√	\checkmark		V	V	V	V	V	√	V	~	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams

CO 3: Use of Steam Tables and MollierChart to solve vapour power cycle problems.	V	V	V	V	Ý	V	V	V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams
CO 4: Demostrate the constructional features and working of steam power plants and to evaluate their performance.	V	V	V	V	V	V	V		V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams

Paper BTME 402-18 Fluid Machines

Course Outcome	PO 1	PO 2	РО 3	PO 4	РО 5	PO 6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Determine discharge and head loss, hydraulic and friction coefficient, for different types of flow in pipe and open channels.	V	V	V			V	V		V		2	V	Knowledge	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
CO 2:Know about constructional details, working and design aspects of runner/wheel and evaluate the performance of various turbines like Pelton. Kaplan and Francis.	V	V	V	-		V	V		V	V		V	Knowledge	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
CO 3: Know about constructional details, working and evaluate the performance of centrifugal pump under different vane shape conditions.	V	V	V			V	V		V	V		~	Knowledge	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
CO 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of various deviations from the ideal					- AL		lechani	al Engi	leating	and the second se					
CO5: Know about constructional details and working of hydraulic devices like fluid coupling, accumulator and intensifier.					I.K.G. Kaput	hal e	1.11503 ·	i n pu	1.8				Knowledge	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.

BTME403-18 STRENGTH OF MATERIALS-II

Course Outcome	PO 1	РО 2	PO 3	PO 4	РО 5	PO 6	РО 7	PÓ 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Understand the concepts of stress and strain at a point, in the members subjected to axial, bending, torsional loads and temperature changes.	V	V	V			V			V	V	V	V	Understanding	Yes	Minor Exams, Assignments, End T Exams
CO 2: Determine principal stresses, maximum shearing stress and their angles, and the stresses acting on any arbitrary plane within a structural element.	V	V	V			V			V	V	V	V	Understanding and Analysing	Yes	Minor Exams, Assignments, End T Exams
CO 3: Find bending moment and shear force over the span of various beams subjected to different kinds of loads.	~	V	V		~	V			V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End T Exams
CO 4: Calculate load carrying capacity of columns and struts and their buckling strength.	V	V	V		~	V			V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End T Exams
CO 5: Evaluate the slope and deflection of beams subjected to loads.	V	V	V		V	V			V	V	V	V	Analysing	Yes	Minor Exams, Assignments, End ⁻ Exams
BTME404-18 MATERIALS ENGIN	IEERI	ING						Ja		N. N	Denat I.K.G Kapu	P.T.!)	Mechanical Engineering Mach Gampus	0	
Course Outcome	PO 1 (En gine erin	ble		ndu	1.5	e	PO 7 (En viro	ics)	(Ind ivid		ject			Focus on Employabilit y / Entrepreneu rship	Attainment of CO

CO1: Illustrate the significance of structure-property-correlation for engineering materials including ferrous and nonferrous.	~	V	-	V	V	√	V		V	V	V	V	Underst Jing, Applying and Designing	Yes	Minor Exams, Assignments, End T Exams
CO 2: Explain the use and importance of various heat treatment processes used for engineering materials and their practical applications.	V		V	V	V	V	v	V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams
CO 3: Identify the various structural changes occurred in metals with respect to time temperature transformations.	V	V	V	V	V	V	V		V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams
CO 4: Interpret the significance of Fe-C and TTT diagram for controlling the desired structure and properties of the materials.	V	V		V	V	V	V Te	V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams
								1 manual Fra							
BTME405-18 : Theory of Machin	es -II			The second	operions K.G. P.	nt of Me T.U. M Raiz	enn Co	mpus							
BTME405-18 : Theory of Machin Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	nt of Me T.U. M rala PO 6	PO7	PO 8		PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu	Assessment Tools to Measu Attainment of CO
	РО	PO		PO	PO	PO		РО	PO				Skill Understanding & Applying	Employabilit y /	
Course Outcome CO1: Understand the basic concepts of inertia forces & couples applied to reciprocating parts of a	PO 1	PO 2	3	PO 4	PO	PO		РО	PO		11	12	Understanding &	Employabilit y / Entrepreneu rship	Attainment of CO Minor Exams, Assignments, End T

CO4: Understand the concept and application of gyroscopic effect.	V	V	V	√	V	0				V	Understationg & Applying	Yes	Minor Exams, Assignments, End T Exams
CO5: Gain knowledge of kinematic synthesis.	V	V	V	V	V				V	V	Understanding & Applying	Yes	Minor Exams, Buisness Quiz, End * Exams

EVS101-18 ENVIRONMENTAL SCIENCE

Course Outcome	РО 1	PO 2	PO 3	РО 4	PO 5	PO 6	P07	PO 8	PO 9	PO 10	P0 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
Students will enable to understand environmental problems at local and national level through literature and general awareness.	V	v v	V	√							V	v	Understanding & Applying		Minor Exams, Assignments, End Exams
The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various	V	V	V	V	V						V	V	Understanding & Applying	Yes	Minor Exams, Assignments, End T Exams
The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate	√	V	V	V	V						V	V	Understanding & Applying	Yes	Minor Exams, Assignments, End Exams
Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world	V	V	V	V	v *	Dense	P.T.I	Mecha	iical Em	inedin		V	Understanding & Applying	Yes	Minor Exams, Assignments, End ⁻ Exams

BTME406-18 APPLIED THERMODYNAMICS Lab

Course Outcome	PO 1 (En gine erin	ble	3 (De	ndu	der		7 (En viro	PO8 (Eth ics)	(Ind ivid	10 1 (Co	PO 11 (Pro ject Man	e		Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Explain the functioning and performance evaluation of reciprocating air compressors.	V		V	V	V	V	V		V	~		V	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End T Exams
CO 2: Analyze the combustion phenomenon in boilers and I.C. engines.	V	V		V	V	V	V	V	~	V	~	~	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams
CO 3: Use of Steam Tables and MollierChart to solve vapour power cycle problems.	~	V	V	~	V	~	~	~	~	✓	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams
CO 4: Demostrate the constructional features and working of steam power plants and to evaluate their performance.	√	V	V	~	~	V	~		~	~	V	~	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams
Paper BTME407-18 Fluid Machin	nes La	зb		CHR = X	K.G. P.1	> T.U. M T.U. M	<mark>chanical</mark> Isia Can	Enginer mpus	cing						
Course Outcome	PO 1	РО 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PO9	PO1 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu	Assessment Tools to Measu Attainment of CO
CO1: Conduct experiments on scaled down models or on actual size hydraulic machines and evaluate results in terms of unit or specific quantities for comparison	~	V	V	-	V	V	~		V	~	V	~	Applying	Yes	Case Study, Group Discussions e
CO 2: Understand the working of various hydraulic machines (turbines and pumps) and can suggest remedial solutions for various faults.	~	V	V		V	V	V		~	V	V	~	Understanding	Yes	Case Study, Group Discussions e

Paper BTME408-18 Material Engineering Lab

Course Outcome	P0 1	PO 2	PO 3	PO 4	P0 5	РО 6	P07	7 PO8	PO9	PO1 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
Analyse the microstructure of different ferrous and non-ferrous samples.	V	V	V		~	V	V		V	V	V	V	Applying	Yes	Case Study, Group Discussions
Explore the effect of heat treatment on various engineering materials by analysing its microstructure and hardness	~	~	~		~	~	~		√	~	~	~	Understanding	Yes	Case Study, Group Discussions
BMPD401-18 Mentoring and pr	ofessi	onal I	Devel	opme	ent		I.K.C	erimoni o G. P.T.! purtinala	U. Medi			0			
Course Outcome	PO 1	PO 2	PO 3	РО 4	PO 5	РО 6	P07	PO8	PO9	PO1 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	V	V	~		V		V	V	~	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.			V		V	V	V	V	~	~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam		
CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process		V	√		\checkmark		~	V	√	~	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam

CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.	V	√		~	V	V		~		V	O Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exan
--	---	---	--	---	---	---	--	---	--	---	--------------------	-----	---

BTME501-18 Heat Transfer

	PO 1 (En gine erin	ble	3 (De sign	ndu	5 (Mo der	6 (Th e	7	PO8 (Eth ics)	(Ind ivid	10 1 (Co 1 mm	11	e		Focus on Employabilit y / Entrepreneu	Assessment Tools to Mease
To teach students the basic principles of conduction, radiation, and convection heat transfer. Students will demonstrate an understanding of the basic	V		~	~	~	~	V		√	√	Man	√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Exams
To extend the basic principle of conservation of energy to systems that involve conduction, radiation, and heat transfer. Students will demonstrate an understanding of	~	V		~	~	~	~	~	V	V	~	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams
To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will demonstrate the ability to formulate practical	~	√	~	V	V	~	~	V	V	¹ √ 1	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, Enc Exams
To train students to identify, formulate, and solve engineering problems involving forced convection heat transfer, natural convection heat transfer, and heat	V	V	~	√ [∞]	~	~	~		V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, Enc Exams
To train students to identify, formulate, and solve engineering problems involving radiation heat transfer among black surfaces and among diffuse gray surfaces.	~	~	~	~	V	~	V		V	V	~	~	Understanding, Applying	Yes	Minor Exams, Assignments, En Exams

													-	Focus on	
Course Outcome	PO 1	PO 2	РО 3	PO 4	РО 5	РО _6	P07	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Employabilit y / Entrepreneu rship	Assessment Tools to Meas Attainment of CO
CO1: Demonstrate recalling and applying knowledge of Basic Sciences, Graphics & Drawing, Basic Manufacturing Processes and Material Science. for design	V	V	V	V	V	V				V	V	V	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO2: Comprehend the effect of different stresses and strains under various loading conditions on the mechanical components and identify the mechanism/mode of	V	V	V	V	V	V				V	V	V	Understanding and Applying	Yes	Minor Exams, Assignments, End Exams
CO3: Examine and solve design problems involving machine elements on the basis of various theories of failure.	V	\checkmark	v	√ _	\checkmark	V	-			V	V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO4: Synergize forces, moments and strength information to develop ability to analyze, design and/or select machine elements aiming for safety, reliability, and	V	V	V	V	V	V	~			V	V	V	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, Enc Exams
Paper BTME 503-18 Manufactur	ing P	roces	ses	A	en Sparinn K.G. P Kapurt) mi of M T.U. i pala	echanica Judo Ca	l Engine mpus	ecting	•					
Course Outcome	PO 1	PO 2	PO 3	РО 4	PO 5	P0 6	о РО7	PO8	PÒ9	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Meas Attainment of CO
CO1: Understand the different conventional manufacturing methods employed for making different products.	V	V	V		V	V	V			V	V	V	Understanding	Yes	Minor Exams, Quiz, Assignment Term Exams
CO 2: Understand the different unconventional manufacturing methods employed for making different products.	V	V	V		V	V	~			V	V	V	Understanding	Yes	Minor Exams, Quiz, Assignment Term Exams

Paper BTME 503-18 Management & Engineering Economics

Course Outcome	PO 1	PO 2	PO 3	PO 4	P0 5	PO 6	P07	7 PO8	PO9	9 PO1 0	L PO1 1	1 PO1 2	1 Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Explain the development of management and the role it plays at different levels in an organization.	~						V	~	~	V	V	V	Understanding		Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 2: Comprehend the process and role of effective planning, organizing and staffing for the development of an organization.							V	~	~	~	V	~	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 3: Understand the necessity of good leadership, communication and coordination for establishing effective control in an organization.							V	~	~	V	√	V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam:
CO 4: Understand engineering economics demand supply and its importance in economics decision making and problem solving.							V	V		V		V	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 5: Calculate present worth, annual worth and IRR for different alternatives in economic decision making.	~	V	~	V	V	~	V	V	~	V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 6: Understand the procedure involved in estimation of cost for a simple component, product costing and depreciation, its methods.	V	~	~	V	√	~	V	V	~	V	~	V	Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exam
Paper BTME 503-18 Heat Transfe	ier La	ıb		-	IKC) Jertiment o .G. P.T.! purthale	i of Mecha 1.1. Missio 12	anical Er or Contr	ngine si pus	ng					

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	.,o 6	P07	PO8	PO9	P01 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Meas Attainment of CO
Design and fabricate the experimental setups related to heat transfer phenomena.	√	V	~		V	V	V			\checkmark	V	V	Understanding	Yes	Minor Exams, Quiz, Assignments Term Exams
Measure and analyse different heat transfer parameters.	V	V	V		V	V	V			V	V	V	Understanding	Yes	Minor Exams, Quiz, Assignments Term Exams
Paper BTME 506-18 Manufactur	ing P	roces	ses L	abora	itory										
Course Outcome	P0 1	РО 2	PO 3	PO 4	P0 5	PO 6	P07	PO8	PO9	PO1 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu	Assessment Tools to Measu Attainment of CO
CO1: Determine/calculate the clay content, moisture content, hardness, permeability and grain fineness number of moulding sand sample.	V	V	V	v	V	V	V			V	V	~	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
CO 2: Use oxy-acetylene gas welding, manual arc welding, MIG, TIG and spot-welding processes to make various joints.	V	V	V	V	V	~	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
CO 3: Use machine tools such as lathe, shaper and milling machine for machining/cutting various profiles on work pieces.	V	V	V	√	M.K) erimon .G.VP.1 purthe	1.√.	hanical I In Cont	ingined ipus	ing √	V	~	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
CO 4: Learn about the constructional features and working of grinding machines, hydraulic press, draw bench, rolling mills, drawing and extrusion equipment	V	V	\checkmark	V	V	~	~			V	V	√	Applying	Yes	Minor Exams, Buisness Quiz, End Exams

Paper BTME 507-18 Numerical Methods Lab

Course Outcome	P0 1	PO 2	PO 3	PO 4	PO 5	РО 6	P07	7 PO8	PO9	PO1 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment roots to Measu
Understand different implementation modes of numerical methods.	√	V	V	V	V	√	V	e e		~	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Use the numerical methods with the understanding of limitations of these methods for solving problems.	V	~	~	~	√ 	~	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Develop and implement their own computer programs.	V	V	V	V	V	V	V			V	~	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Solve problems more accurately and efficiently in low computational time.	~	~	~	~	V	~	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Handle the problems conveniently which are difficult to deal with manually	~	V	V	V	~	~	V			V	~	~	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Paper BTMC102-18 ESSENCE OF	IND	IAN F	(NOW	/LEDG	je tr	ADIT	ION		A DELK	(1)	it of Me r T21, 21 ale	hanical dia Car	Engineering mpus		
Course Outcome	P0 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PO9	PO1 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO

 \cap

6.7

			1	T	<u> </u>	-	T	1	-	T			1		1
Understand the Philosophy of Indian Knowledge system and and its Basic Structure.	√	V	V	V	V	~	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Understand the Ancient India Culture, Society and Religion.	V	V	V	V	V	~	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Examine the areas of Indian Linguistic Tradition.	V	~	V	V	V	~	~			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, En Exams
Know the contrubtion of scientists of different eras.	V	~	~	V	V	V	~			V	~	V	Applying	Yes	Minor Exams, Buisness Quiz, En Exams
Handle the problems conveniently which are difficult to deal with manually	V	V	V	V	\checkmark	~	~			V	~	~	Applying	Yes	Minor Exams, Buisness Quiz, Er Exams
Paper BTME 409-18 4 weeks ind	lustri	al tra	ining	1	Den		oi šied	initial F In Con							
Course Outcome	PO 1	PO 2	PO 3	РО 4	-	PO 6		PO8		DO1	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
Capability to acquire and apply fundamental principles of engineering.	V	V	√	V	V	~	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, Er Exams
Become master in one's specialized technology	V	~	V	V	V	~	V			V	~	V	Applying	Yes	Minor Exams, Buisness Quiz, E Exams
			L'	L	<u> </u>	L'	<u> </u>	<u> </u>		<u> </u>	L'	<u> </u>		аа	

			r							-					
Become updated with all the latest changes in technological world.	V	V	V	V	V	(V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Ability to communicate efficiently.	V	V	V	V	V	V	~			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	V	V	√	V	V	V	V			√ .	v	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	V	V	V	V	V	V	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Capability and enthusiasm for self- improvement through continuous professional development and life- long learning	V	V	V	V	v	V	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
Awareness of the social, cultural, global and environmental responsibility as an engineer.	V	V	V	V	V	V	V			V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
BTME601-18 REFREGERATION	AND /	AIR C	ONDI	TION	ING	I.K.	timeni o 3. P.T.! urthala	l spen	nical En Comp	ginesin ous	0				
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Understand the fundamental principles and applications of refrigeration and air conditioning system	V	V	V	V	V		V	V	V	V	V	V	Understanding	Yes	Minor Exams, Assignments, End 1 Exams

				—				-						
V	V	~	V	V	2	V		~		V	~	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
V		~	V	V	~	V		V	V	V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
~	~		~	V	V		~	V	V		v	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
~	V	~	~	~		~		V	~	V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
							Xe	1				-9		
Meas		ents 8	§ Met	rolog	У	i.	Departiti I.K.G. Kapur	PTU.	Vechani Nizin C	al Engi Jampu	neering S			
PO 1	PO 2	ents 8 PO 3	PO 4	PO 5	PO		IKG.	P.T.U. Mala	Viechani Main (PO1 0	iampu	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Meas Attainment of CO
PO	PO	PO	PO	PO	PO		I.K.G. Kapur	P.T.U. Mala	PO1	PO1	S PO1		Employabilit y /	Assessment roots to Meas
PO 1	PO 2	PO 3	PO 4	PO 5	PO 6		I.K.G. Kapur	P.1.0.	PO1 0	PO1 1	PO1 2	Skill	Employabilit y / Entrepreneu rship	Attainment of CO Lectures, Tutorials, Assignme Powerpoint Presentations, Num
	√ √	✓ ✓ ✓ ✓											\checkmark	\checkmark

						r		1							
CO 4: To learn metrology of screw, gear and surface texture.	V	V	✓	√	~	~			V	V	V	V	Understanding	Yes	Lectures, Tutorials, Assignmer Powerpoint Presentations, Nume etc.
BTME603-18 AUTOMOBILE ENG	INEE	RING											1		
Course Outcome	PO 1 (En gine erin	PO 2 (Pro ble m		ndu	der	PO 6 (Th e Engi	viro	ics)	(Ind	mm	ject		Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Identify the different parts of the automobile.	V		V	V	\checkmark	V	V		~	V	V	V	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO 2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems.	V		~	~	V	V	V	√ .	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams
CO 3: Explain the need of vehicle safety systems and future developments in the automobile industry.	V	V	~	V	V	V	v	V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams
Paper BTME 604-18 Introduction	n to I	ndus	trial N	1anaç	geme	nt	De	perinen L.G. P.T purtha	31 11	hanical (Engines pus	ing]			
Course Outcome	P0 1	PO 2	PO 3	P0 4	PO 5	PO 6	P07	PO8	PO9	P01 0	P01 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Mease Attainment of CO
CO1: 1.Understand the complexities associated with management in the organizations and integrate the learning in handling these complexities.	V	V	V		V	V	V	V	V	V	V	V	Understanding	Yes	Minor Exams, Buisness Quiz Assignments,End Term Exan

CO 2: 2.Demonstrate the roles, skills and functions of management.	V	V	V		~	V	V	V	V	V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam
CO 3: 3.Understand the concepts related to industrial management.	V	V	V	V		V	V	V	V	V	V	V	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exam:

BTME605-18 REFREGERATION AND AIR CONDITIONING LAB

STME605-18 REFREGERATION AND AIR CONDITIONING LAB													IKG. PTU. Mechanical Engineering						
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	РО 6	P07	PO 8	PO 9	PO 10	PO 11	PO 12	<u>J. Man Campus</u> Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO				
CO1: Understand the fundamental principles and applications of refrigeration and air conditioning system	V	V	√	V	V		V	V	V	V	√	V	Understanding	Yes	Minor Exams, Assignments, End Exams				
CO2: The students will be able to obtain cooling capacity and coefficient of performance by conducting test on refrigeration systems	V	V	V	V	V		~		V		V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams				
CO3: The students will develop ability to calculate the energy requirements of cooling and heat equipment for air conditioning applications.	V		V	V	V	V	V		V	V	v	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams				
CO4: The students will be able to Explain the properties, applications and enironmental issues of different refrigerants.	V	V	0	V	V	√		V	V	V		V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams				
CO5: The students can demonstrate an ability to analysis psychrometric processes and cycles of air conditioning systems.	V	V	V	V	V		V		V	V	V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams				

Paper BTME606-18 Mechanical Measurements & Metrology Lab

 \bigcirc

					1	1	1		1	-		-			
Course Outcome	PO 1	PO 2	РО 3	ро 4	PO 5	PO 6	P07	PO8	PO9	PO1 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Demonstrate the use of instruments for measuring linear (internal and external), angular dimensions and surface roughness.	V	V	V	V	√.	V			V	V	V	V	Understanding	Yes	Case Study, Group Discussions,
CO 2: Identify proper measuring instrument and know requirement of calibration, errors in measurement etc.	V	V	V	~	V	V			~	V	V	V	Knowledge	Yes	Case Study, Group Discussions,
CO 3: Apply analytical and experimental methods to make measurements and to find and correct defects in measurement systems.	V	V	V	~	~	*			V	V	V	V	Applying	Yes	Case Study, Group Discussions,
BTME603-18 AUTOMOBILE ENG	INEE	RING	LAB		IKG	inneni ol P.T.U artinale	Mechal Nation	nical En Gamp	gineerin us						
Course Outcome	PO 1 (En gine erin	PO 2 (Pro ble m	PO 3 (De sign /De	ndu	PO 5 (Mo der n	PO 6 (Th e Enai	PO 7 (En viro nme	ics)	PO 9 (Ind ivid ual	mm	PO 11 (Pro ject Man		Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: Identify the different parts of the automobile.	V		V	V	v	V	V		-√	V	V	V	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End T Exams
CO 2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems.	V		V	~	~	V	~	V	~	V	V	~	Understanding, Applying	Yes	Minor Exams, Assignments, End T Exams

 \bigcirc

CO 3: Explain the need of vehicle safety systems and future developments in the automobile industry.	V	V	~	V	V	5 v	V	V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End ⁻ Exams
---	---	---	---	---	---	----------	---	---	---	---	---	---	----------------------------	-----	---

BTME-608-18 : Minor Project

	r	· · · ·	r								_				
Course Outcome	P0 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	РО 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Mease Attainment of CO
CO1:Identify an open ended problem in area of mechanical engineering which requires further investigation.	V		V		V	V	\checkmark	V	V	V	V	V	Understanding	Yes	Reports, Project Presentations and Viva
CO2: Identify the methods and materials required for the project work.	V	V	V	V	V	V	V	V	V	V	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
CO3: Manage the work with team members.	V		V	V	V	V	V	V	V	V	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
CO4: . Formulate and implement innovative ideas for social and environmental benefits.	V	V	V	V	V	V	V	V	V	v	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
CO5: Write technical report of the project apart from developing a presentation.	V	V	V	V	√	V	V	6	V	V	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
Paper: Internal Combustion En	gines	609-	18					Denerio I.K.C. Kapur	PT	Mechani	cal Eng Campu	ine ering S			

Course Outcome	P0 1	PO 2	PO 3	PO 4	PG 5	PO6	P07	PO8	P09	PO1 0	PO1 1	PO1 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Meas
CO1:Knowledge about the basics of IC engines	V	V	√	V			√		V	~		V	Understanding	Yes	Minor Exams, Quiz, demonstrat through videos/ lab, End Term E
CO2:Ability to evaluate operational characteristics of IC Engines	~	V	V	V		~	~		~	~	~	V	Understanding	Yes	Minor Exams, Quiz, demonstrat through videos/ lab, End Term E
CO3:Ability to ascertain the effects of fuel/supply systems on emission from an engine.		V	~	V	~		V				V	V	Understanding	Yes	Minor Exams, Quiz, demonstra through videos/ lab, End Term E
CO4:Ability to test engine performance		V	~	V	~		V	~		~		V	Applying		
BTME-610-18 Mechatronics Syst	tems		T	HOE Boolerinn I.K.G. P Kapurth	P.T.U.	lechanic Media G	al Engin Simpus	leeting				1			
Course Outcome	P0 1	PO 2	PO 3	PO 4	- F F.	PO 6	P07	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Mease Attainment of CO
CO1: Design mux, demux, flip- flops, and shift registers.		~	V	V	V		V	V	√	V	V		Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO2:Describe the block diagram, registers, ALU, bus systems, timing & control signals, instruction cycles, and interrupts of 8085 microprocessors.	√	√ .			V		V	V	~	~	√ 5	~	Applying and Designing	Yes	Minor Exams, Assignments, End Exams

CO3: Apply the concept of 8085	T	T		T	T	T	1	-			-				
microprocessor instruction sets and addressing modes in writing assembly language program for a given problem.	V	V	V		√	V	V	√	V	V	~		Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO4: Describe the interfacing of memory, 8255 PPI, ADC, DAC, 7- segment LED system, stepper motor, 8251 and 8253 ICs with 8085 microprocessor	V		√	V	~		V			~		~	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
BTME-611-18 Microprocessor in	auto	matic	on			E.	K.G. P.1	nt of Ms T.U. 11 ala	<mark>chanical</mark> aiu Ga	Engine mpus					
Course Outcome	PO 1	PO 2	P0 3	PO 4	PO 5	PO 6	P07	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu	Assessment Tools to Measu
Student is able to describe the architecture and different modes of operations of a typical microprocessor.		V	~	V	~		V	√.	V	V	~		Applying and Designing	Yes	Minor Exams, Assignments, End T Exams
Student is able to understand different addressing modes and instructions of 8086 design and develop assembly language programs using software interrupts.	V	V			V		~	V	V	V	V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
Student is able to interface memory, I/O devises and interrupt controller with 8086 microprocessors.	V	V	V		V	~	V	√	V	V	√.		Applying and Designing	Yes	Minor Exams, Assignments, End Exams
Student is able to describe the internal architecture and different modes of operations of a typical microcontroller	~		V	√.	V		V			~		v	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
Student is able to design and develop assembly language programs using 8051 microcontroller	V		V	~	\checkmark		V			~		~	Applying and Designing	Yes	Minor Exams, Assignments, End Exams

CS 305.6 Student is able to analyze and compare the features of microprocessors and microcontrollers.	V	V	V	~	V		\checkmark	V	Applying and Designing	Yes	Minor Exams, Assignments, End ⁻ Exams
		 	_						and the second second		

BTME612-18 COMPOSITE MATERIALS

	gine erin	ble	3 (De sign	4 (Co ndu	5 (Mo der	6 (Th e	7 (En viro	PO8 (Eth ics)	Ind ivid	10 1 (Co mm	11	12 (Lif e	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
CO 2: Suggest/select optimum combination of Matrix/Reinforcement for various engineering applications.	~	v	V	~	× V	V	~	~	√	√	~	√	Understanding, Applying	Yes	Exams Minor Exams, Assignments, End Exams
CO 3: Analyze the effects of influencing factors on the strength of composite materials.	~	V	V	V	V	V	V		~		V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End ⁻ Exams
BTME-613-18 Computer Aided D	esigr	1				4	Department I.K.G. P. Kapurtha	P.T.U. M	schanice Julia Gr	Engine Empus					
Course Outcome	P0 1	PO 2	PO 3	PO 4	PO 5	P0 6	P07	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu
CO1: Create the different wireframe primitives using parametric representations	√	✓	V		V		V	√		V	V	2	Applying and Designing	Yes	Minor Exams, Assignments, End Exams

							1		1		1				
CO2: Create surface primitives using parametric modeling.		V		V	V	5	V	√	V		V	V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO3: Create the different solid primitives using the different representation schemes	V		V	V	V		V	V	V	V	V		Applying and Designing	Yes	Minor Exams, Assignments, End Exams
CO4: Apply geometric transformations on the created wireframe, surface and solid models.	V	V	v		V	V	V		V	V		V	Applying and Designing	Yes	Minor Exams, Assignments, End Exams
Paper BTME 614-18 Product Des	ign 8	l Dev	elopn	nent			1	Bonarti I.K.G. Kapu	P.T.U.	Wechani Islaid) (cal Eng Dampu	ine ering IS		<u>,</u>	
									1.1				1	Focus on	
Course Outcome	PO 1	РО 2	РО 3	PO 4	PO 5	PO 6	P07	PO8	PO9	PO1 0	PO1 1	PO1 2	Skill	Employabilit y / Entrepreneu	Assessment Tools to Measu Attainment of CO
Course Outcome CO1: Understand desirable design aspects considering various production processes and also understand the economic factors of design.							P07	PO8	PO9				Skill Understanding	Employabilit y /	Assessment roots to measu
CO1: Understand desirable design aspects considering various production processes and also understand the economic factors of	1	2	3	4	5	6				0	1	2		Employabilit y / Entrepreneu rship	Attainment of CO
CO1: Understand desirable design aspects considering various production processes and also understand the economic factors of design. CO 2: Employ engineering, scientific, and mathematical principles to execute a design from	1 √	2 √	3 √	4 √	5 √	6 √	V	~	~	0 √	1 √	2	Understanding	Employabilit y / Entrepreneu rship Yes	Minor Exams, Quiz, Assignments, Term Exams

BTME 615-18 : Non Conventional Energy Resources

Course Outcome	PO 1	PO 2	PO3	3 PO 4	PO 5	P0 6	P07	7 PO 8	РО 9	PO 10	PO 11		L CLiU	Focus on Employabilit y / Entrepreneu rship	Assessment roots to Measu
CO1: To Explain renewable energy sources & systems.	V	V				√			54	•		V	Understanding	Yes	Minor Exams, Buisness Quiz, End Exams
CO2: To Apply engineering techniques to build solar, wind, tidal, geothermal, biofuel, fuel cell, Hydrogen and sterling engine	V	V	~	~	~	~	~	V	~		V		Designing	Yes	Minor Exams, Buisness Quiz, End
CO3: To Analyze and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to solar radiation geometry and wind	V	~	~	~	~	~	~				V		Applying	Yes	Minor Exams, Buisness Quiz, End Exams
CO4: To Demonstrate self -learning capability to design & establish renewable energy systems.	V	V	\checkmark	V	\checkmark	~	V	V	V		V	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
CO5: To Conduct experiments to assess the performance of solar PV, solar thermal and biodiesel systems		V	V	V	V	V	V	~	V		~	V	Applying	Yes	Minor Exams, Buisness Quiz, End Exams
BTME616-18 : OPERATION RESE	EARC	н			J	IKG	Timeni ofi G. P.T.U.	Asses	anical Eng	dinection					
Course Outcome	PO 1	PO 2	PO 3	PO 4.	PO 5	-	1		PO 9	PO 10	PO 11		Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu

CO1: Explain various mathematical							1	1	1		-	_			
deterministic operation research models.	V	V	V	V	~			√	V	V	, √	V	Understanding, Applying	Yes	Minor Exams, Class and Hor Assignments, End Term Exa
CO2: Describe the problems of probabilistic and simulation models.	V	V	V	V	~			V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Class and Hor Assignments, End Term Exa
CO3: Demonstrate the queuing, inventory and replacement models etc.	V	V	~	V	~		4	V	V	V	V	V	Applying and Designing	Yes	Minor Exams, Class and Hor Assignments, End Term Exa
CO4: Formulate and analyze the network models.	V	V	V	V	~			•. √	V	V	V	V	Applying and Designing	Yes	Minor Exams, Class and Hon Assignments, End Term Exa
DTMES17 10. MAINTENANOS A					(2				TI					
BTME617-18: MAINTENANCE &	RELI,	ABIL]	(TY		LKK	G.P.	nt of Mec 1.U. Ma ala	<mark>hanical</mark> de Car	Enginee npus	ling					
Course Outcome	PO 1	PO 2	РО 3	PO 4	PO 5	PO 6	nt of Med T.U. Ma ala PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Attainment of CO
Course Outcome CO1: Understand the concepts of reliability and maintainability	PO	PO	РО		PO	PO	12	РО	PO	PO			Skill Understanding	Employabilit y /	Attainment of CO
Course Outcome	P0 1	PO 2	PO 3	4	PO 5	PO 6	907	PO 8	PO 9	PO 10	11	12		Employabilit y / Entrepreneu rship	Assessment Tools to Mea Attainment of CO Minor Exams, Assignments, En

Paper BTME701-18 Mechanical Vibrations

Course Outcome	РО	РО	РО	PO	PO	PO	807		PO9	PO1	P01	P01		Focus on Employabilit	Assessment Tools to Measu
	1	2	3	4	5	6	107	PUS	PU9	0	1	2	Skill	y / Entrepreneu rship	Attainment of CO
CO1: Formulate mathematical models of problems in vibrations using Newton's second law or energy	V	V	V	V	V	V	V		~	V	V	V	Understanding	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
CO 2: Understand the need and measurement of vibration in mechanical systems.	V	V	V	V	V	~	V		V	V	~	V	Understanding	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Numer etc.
CO 3: Calculate principal modes of vibration.	V	V	V	V	V	V	V		~	V	V	V	Applying	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Numer etc.
CO4: Explore the suitable methods of vibration reduction and absorption.	V	V	V	V	V	V	V		V	V	V	V	Applying	Yes	Lectures, Tutorials, Assignment Powerpoint Presentations, Numer etc.
CO5: Ability to determine vibratory responses of SDOF and MDOF systems.	V	V	V	V	V	V	V	5	V	V	√ √	V	Analyse	Yes	Lectures, Tutorials, Assignment Powerpoint Presentations, Numer etc.
CO6: Ability to determine vibratory responses of SDOF and MDOF systems.	V	V	V	√	V	√	√		\checkmark	V	V	V	Analyse	Yes	Lectures, Tutorials, Assignment Powerpoint Presentations, Numer etc.
Paper BTME702-18 Automation	in ma	nufa	cturin	g	- Den	C PT.	of Mech U. Mitsi	anical E A Gamj	ngineerin pus	1					

O

Course Outcome	PO 1	РО 2	PO 3	PO 4	PO 5	ۍ و ک	P07	PO8	P09	P01 0	P01 1	P01 2	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Mease Attainment of CO
Illustrate the basic concepts of automation in machine tools.											i.				
Analyze various automated flow lines, Explain assembly systems and line balancing methods.	~	V	v	V	V	~	v		~	~	~	V	Applying	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
Describe the importance of automated material handling and storage systems.	~	V	V	√	V	~	V		~	V	V	V	Understanding	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
Interpret the importance of adaptive control systems, automated inspection systems.	\checkmark	V	~	√	v	~	~		\checkmark	V	V	V	Applying	Yes	Lectures, Tutorials, Assignmen Powerpoint Presentations, Nume etc.
BTME703-18 Fundamentals of M	lanag	emer	it for	Engin	ieers	- Har	Primerit of	Mecha	alast Fai		1				
						Kapu	s. P.T .U. Intina la	, electric	Compl	gine ering us					•
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	Kapu	PO7	PO 8		• • •	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Meas Attainment of CO
Course Outcome CO1: The students understand the significance of Management in their Profession	1				РО	PO	artinale	PO	PO	PO	PO			Employabilit y / Entrepreneu	Assessment Tools to Meas Attainment of CO Minor Exams, Assignments, End Exams

CO3: Understand the complexities associated with management in the organizations and integrate the learning in handling these complexities.	√	√	V	V	V	V		V	V	V	V	V	Understanding, Applying	Yes	Minor Exams, Assignments, End Exams
CO4: Demonstrate the roles, skills and functions of management.	V			V	√	V		V	V	~	V	V	Applying	Yes	Minor Exams, Assignments, End Exams
BTME-704-18 : Project-II						IKG	riment of 3. P.T.U.	1, 997-93	nical En Comp	gineering	1	<u> </u>		. 51	
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6			PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Tools to Measu Attainment of CO
CO1: To create an Industrial environment and culture within the institution.	V		V		V	√	V	V	V	V	V	~	Understanding	Yes	Reports, Project Presentations and Viva
CO2: To set up production lab utilizing the infrastructure of the institution.	~	~	V		V	V	V	V	~	~	V	~	Applying and Designing	Yes	Reports, Project Presentations and Viva
CO3: To standardize laboratories to industrial standard, thereby giving exposure to industrial housekeeping standards.	~	V	~		V	V	V	V	~	~	V	~	Applying and Designing	Yes	Reports, Project Presentations and Viva
CO4: Demonstrate an ability to present and defend their research work to a panel of experts.	V		V	V	~	V	V	V	V	V	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
CO5: Demonstrate knowledge of contemporary issues in their chosen field of research.	v	V	\checkmark	~	V	\checkmark	\checkmark		V	v	V	\checkmark	Applying and Designing	Yes	Reports, Project Presentations and Viva

BTME-801 Software/Industrial Training

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P07	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employabilit y / Entrepreneu rship	Assessment Jools to Measu
Capability to acquire and apply fundamental principles of engineering.	√ -		V		V	V	V	V	V	V	V	V	Understanding	Yes	Reports, Project Presentations and Viva
Become master in one's specialized technology	V	V	V		V	V	V	V	V	V	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
Become updated with all the latest changes in technological world.	V	V	V		V	V	V	V	V	V	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
Ability to communicate efficiently.	V		V	V	√	V	V	V	V	* √	V	V	Applying and Designing	Yes	Reports, Project Presentations and Viva
Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	V	V	V	V	√	V	V		V	V	V	√	Applying and Designing	Yes	Reports, Project Presentations and Viva
Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	V	V	~	CHEX.	PT.	of Mech	anical E 1 Com	iqineeri Jus		V	V	√	Applying and Designing	Yes	Reports, Project Presentations and Viva
Capability and enthusiasm for self- improvement through continuous professional development and life- iong learning	V	V	V	V	V	V	v		√	V	v	V	Applying and Designing	Yes	Reports, Project Presentations and Viva

0.



Name	of D)ep	art	me	nt:	Me	ech	ani	cal	De	D2	tm	ent		
raper: Advanced Engineering Materials MTME-101-18	<u>}</u>		Safetta.								P	-			
Course Outcome	PO 1	2	3	PO 4	P0 5	PO 6	PO 7	P0 8	9 9			PO 12	Skill	Focus on Employability / Entrepreneurs hip	Assessment To Measure Attai of CO
CO1: Identify and describe different types of material processing techniques for advanced materials		V	V	V		V	V		V	V	V		Understanding	Yes	Minor Exams, demonstrations t videos/ lab, End Exams
CO2: Ability to select suitable material for specific applications	V	V	V	√		V	V	V	V	V		V	Understanding	Yes	Minor Exams, demonstrations t videos/ lab, End
Finite Element Method															Exams
Course Outcome	PO 1	PO 2	PO 3	PO 4	P0 5	PO 6	РО 7	PO 8	PO 9		PO 11		Skill	Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO1: Explain the principles of vibrations;	V			V		V	V			V	\checkmark	V	Understanding	Yes	Minor Exams, Bu Quiz, End Term I
CO2: Define and describe the concepts of vibration modes and natural frequencies and their measurement and estimation for multi-degree-of-freedom systems:	V	V		V		V						V	Understanding	Yes	Minor Exams, Bu Quiz, End Term E
CO3: Explain System Modelling via use of Energy Analysis and its application to complex vibrating systems;	V	V	V	V	V	V	V				√		Applying	Yes	Minor Exams, Bu Quiz, End Term I
CO4: solve linear 2D structural beams and frames problems; 1Dheat conduction and convection heat transfer problems.	V	\checkmark		V		V							Applying	Yes	Minor Exams, Bu Quiz, End Term F
CO5:Recognise the use of different numerical techniques and its application to vibration design;	V	V	V	V	V	V			\checkmark		√	V	Designing	Yes	Minor Exams, Bu Quiz, End Term B
MTME-103 :Advanced Design of Mechanical Systems						_									
Course Outcome	PO 1	2	3	4	5	PO 6	РО 7	PO 8			PO 11		Skill	Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO1: Learn integrating CAE, CAD, CAM tools.	V	V	V	V	V	\checkmark				V	V	V	Understanding	Yes	Minor Exams Assignments, End Exams

CO2: Learn about proper material selection and know about	$ $ \vee		\vee	\vee	\vee	\vee				IV		IV	Understanding	Yes	Minor Exams
influence of materials on form design of welded members,	1				1						1	<u>)</u> .	and Designing		
forgings and castings.												1	and Designing		Assignments, End
CO3: Understand general design principles for manufacturability.	\checkmark	V	\vee	V	V				-			V	Understanding	Yes	Exams Minor Examp
	1.550					·						, v			Minor Exams
													and Designing		Assignments, End
CO4: Design to minimize material usage, design for recyclability		\checkmark	V		\vee			1	-		\checkmark	V	Understanding	Yes	Exams
& energy efficiency and design to regulations and standards.		· · ·	1 ·			1.0				I Y	v	V		res	Minor Exams
													and Designing		Assignments, End
MTME-104 : Operations Management				L	L										Exams
Course Outcome	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	Skill	Ecolus an	1.4
	1	2	3	4	5	6	7	8	9	10			SKIII	Focus on	Assessment Too
	1	-	1	1	1 1 1		14	•	9	110		12		Employability /	Measure Attain
														Entrepreneurs	of CO
	1													hip	
CO1: Understand the concepts of operations management and	V	\checkmark	\checkmark	1	\checkmark			V		V	.√		1 los el sue los el diverses		
various types of manufacturing systems & plant layouts with	1	S. 87	v	V V	*	1		¥	v	V	۰v	\vee	Understanding	Yes	Minor Exams
their characteristics, merits and demerits.													and Applying		Assignments, End
CO2: Learn about different types of planning and concepts of			V				-		-1		,		the development		Exams
MACRO & MICRO process design.	1	v	l *	v	v			V I	√	√	\checkmark	√	Understanding	Yes	Minor Exams
						P							and Applying		Assignments, End
CO3: Know about the concepts of demand forecasting, various	V		V	V	V		-				1				Exams
demand patterns and qualitative and quantitative techniques of	V V	V V	1 *	V	V			V	\checkmark	\checkmark	\checkmark	√	Understanding	Yes	Minor Exams
demand forecasting.													and Applying		Assignments, End
CO4: Understand the concept of aggregate production planning,		\checkmark	\checkmark	-1		-				-					Exams
different scheduling criteria and mutil-stage manufacturing	V	V		\vee	√			$ $ \checkmark	\checkmark	\vee	\checkmark	$ $ \vee	Understanding	Yes	Minor Exams
systems.												þ.,	and Applying		Assignments, End
CO5: Learn about various types of material flow and concepts of	\vee	\checkmark	\checkmark	1	1	-	-	-							Exams
MRP, MRP-II, JIT and ERP along with their characteristics.	1 V	V	V	V	\checkmark			\checkmark	\checkmark	$ $ \vee	\checkmark	$ $ \vee	Understanding	Yes	Minor Exams
a way have 11 set and Era along with their characteristics.								- 23					and Applying		Assignments, End
MTME-105 ADVANCED THERMODYNAMICS									u						Exams
Course Outcome	PO	PO	PO	00	DO	00	DO	00	-						
				PO				PO	PO		-		Skill	Focus on	Assessment Too
Department of Mechanical Engineeting	1	2	3	4	5	6	7	8	9	10	11	12		Employability /	Measure Attain
I.K.G. P.T.U. 11 Compus					i i									Entrepreneurs	of CO
Kapurthala							1							hip	
CO1: Describe the various laws of thermodynamics and their	1	1	./	-1	-1			-		- /					
applications.	√	$ $ \vee	\vee	\checkmark	\checkmark	√ "	\vee		\checkmark	\vee	\checkmark	\checkmark	Understanding,	Yes	Minor Exams,
al human of the second s									1				Applying and		Assignments, End
CO 2: Explain the concepts of availability and irreversibility with	$\overline{\mathbf{v}}$	1	1	1	- 1		-						Desianina		Exams
respect to reacting and nonreacting systems.	V	\checkmark	\checkmark	\checkmark		√	\checkmark	\checkmark	\checkmark	\vee	\checkmark	\checkmark	Understanding,	Yes	Minor Exams,
support to reacting and nonreacting systems.													Applying		Assignments, End
CO 3: Describe methods in using equations of potentials,		-,	1			- ,									Exams
availability and every for thermodynamic and the	√	√	\checkmark	\checkmark	\checkmark	√	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	Understanding,	Yes	Minor Exams,
availability, and exergy for thermodynamic analysis.				1							1		Applying		Assignments, End
	-														Exams

CO 4: Analyse the direct energy conversion methods and their applications.	∱ *∣	V	V	V	V	V	′ √	V		√	Ý	51	Understanding, Applying	, Yes	Minor Exam Assignments, End
MTME 201 RESEARCH METHODOLOGY		-	-L	_	-	1	_				<u></u>			1	Exams
Course Outcome	P0 1						0 PO 7		9 PO		PO 11			Focus on Employability / Entrepreneurs hip	
CO1: Formulate a research problem	4_'		= /										//	aib	
	V				-	-	′ √	V			V	V	Understanding, Applying and Designing	, Yes	Minor Exams Assignments, End Exams
CO 2: Explain the different experimental designs and their analysis.	V	~	\checkmark	\checkmark	√	V	′ √	V	′ √	\checkmark	V	V	Understanding, Applying	, Yes	Minor Exams Assignments, End
CO 3: Apply different statistical tools for the research analysis	V		V	V	√ √	V	√ √			V	V	V	Understanding, Applying	, Yes	Exams Minor Exams Assignments, End
CO 4: Apply the research ethics	V		V	V	V	V	√	V	V	\checkmark	V	√	Understanding, Applying	, Yes	Exams Minor Exams Assignments, End
MTME-202 Tribology					-	1	_	1		L/	L'		L	/	Exams
Course Outcome Dependent of Mechanical Engineering LK.G. P.T.U. Main Compus Kapurthale	PO 1) PO 3	PO 4) PO 5		D PO 7				PO 11			Focus on Employability / Entrepreneurs hip	Assessment Too Measure Attain of CO
CO1: The student will be able to study research papers for understanding of a new field and summarise them.	\checkmark	\checkmark	\checkmark		1		V	V	V	1		V	Understand	Yes	Final Viva
CO2: Ability to identify promising new directions of various cutting edge technologies.		V					V	\checkmark	\checkmark		V	1	Applying and Designing	Yes	Final Viva
CO3:The student will be able to effectively communicate by making an oral presentation. MTME-203: Modern Manufacturing Processes	V		\checkmark	V	V	V	V	\checkmark		\checkmark	\checkmark		Applying and Designing	Yes	Final Viva
Course Outcome	PO	Inc	100	Inc	Inc	1.00	1.00	1.20	1.7.0	1.2.0	1 - +	1	1		
	1		3	4					9 PO			PO 12		Focus on Employability / Entrepreneurs hip	Assessment To Measure Attair of CO
CO1: Understand the importance and applications of advanced manufacturing processes	V	1	V				V	-	~	V	V	V	Understanding		Minor Exam Assignments, En
CO 2: Understand the working principle and theory of material	1				-	-	-	-		$ \rightarrow$			Understanding	Yes	Exams Minor Exam

														Presentations Numericals et
							,							Assignments Powerpoint Presentation
1	V	\checkmark	\checkmark	√	\checkmark	~		V	\checkmark	\checkmark	V	Applying	Yes	Presentation Numericals e Lectures, Tutor
	V	V	V	V	V	V		V	V	\checkmark	V	Understanding	Yes	Lectures, Tuto Assignment Powerpoin
1	2	3	4	5	6	7	8	9					Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
PO	PO	PO	PO	00	-	00	DO	DO	DO					
V	√	V	V			V		V	V	V	V	Understanding	Yes	Minor Exam Assignments, En Exams
			2					V	V	√	V	Understanding	Yes	Minor Exam Assignments, En Exams
V	V	V	V	V				V	V	V	V	Analysing	Yes	Minor Exan Assignments, Er Exams
														Assignments, Er Exams
	√ √ 1 √	√ √ √ √ √ √ 1 2 √ √	$\begin{array}{c c} & & \\ & & \\ \hline \\ & \\ \\ & \\ \\ \hline \\ & \\ \\ \\ \hline \\ \\ \\ \\$	$\begin{array}{c cccc} & & & & & \\ \hline & & & & \\ \hline & & & & \\ \hline & & & &$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ $$	V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V PO PO PO PO PO PO PO 1 2 3 4 5 6 7 V V V V V V V V V V V V V V	$ $$	\checkmark <	\vee	\vee	\checkmark	\vee	V V

CO 2: Upderstand the terms weld-hills	1 12	1 2	1	1	1	-		-							
CO 2: Understand the terms weldability, soldering, brazing, welding symbols and safety and		V	√	√	V	V	\checkmark		\checkmark	V	V	∇	Understanding	Yes	Lectures, Tutor Assignments
															Powerpoint
							e)								Presentations
CO 3: Understand the concept of various terms of welding arc	\checkmark	V		V	V	\checkmark	\checkmark	-	V	V					Numericals et
such as arc efficiency, arc forces,		·		1.1	1	N.	×		V	v	V	$ $ \vee	Understanding	Yes	Lectures, Tutori
â															Assignments
															Powerpoint
															Presentations
CO 4: Learn about the various types of welding electrodes,	$ $ \vee	$ $ \vee	$ $ \vee	$ $ \vee		\checkmark	\vee		\checkmark	\checkmark	\checkmark	\checkmark	Understanding	Yes	Lectures, Tutori
welding fluxes, shielding gases, AC and															Assignments
															Powerpoint
×															Presentations
CO 5: Learn about various advanced welding processes along	V		1	-		,			<u> </u>	<u> </u>					Numericals et
with their advantages, limitations and	V	\vee	\vee	\vee	\vee	\checkmark	\checkmark		√	\checkmark	\checkmark	\vee	Understanding	Yes	Lectures, Tutori
and a deventagesy initiations and															Assignments,
54 C															Powerpoint
															Presentations
Advanced Material Characterization MTME-207-18	-			L	L				·,						Numericals etc
Course Outcome	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	Skill	Franka and	
No.													3KIII	Focus on	Assessment Too
	1	2	3	4	5	6	7	8	9	10	11	12		Emandaria hilitari (
Beneriment of Mechanical Engineering		2	3	4	5	6	7	8	9	10	11	12		Employability /	Measure Attain
Equation of Mechanical Engineering		2	3	4	5	6	7	8	9	10	11	12		Entrepreneurs	Measure Attain
Kaperlinia						6			9	10	11	12			Measure Attain
CO:1 apply appropriate characterization techniques for	1 √	√	3	4 √	5	6	7 √	8 √	9 √	10 √	11	12	Understanding	Entrepreneurs hip	Measure Attain of CO
CO:1 apply appropriate characterization techniques for microstructure examination at						6						12	Understanding	Entrepreneurs	Measure Attain of CO Minor Exams, Q
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the						6						12	Understanding	Entrepreneurs hip	Measure Attain of CO Minor Exams, Q demonstrations th
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various						6						12	Understanding	Entrepreneurs hip	Measure Attain of CO Minor Exams, Q demonstrations th videos/ lab, End
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various	V	V	V	V	V		V		V	V	V			Entrepreneurs hip	Measure Attain of CO Minor Exams, Q demonstrations th
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to						6						12	Understanding	Entrepreneurs hip	Measure Attain of CO Minor Exams, Q demonstrations th videos/ lab, End
CO:1 apply appropriate characterization techniques for	V	V	V	V	V		V		V	V	V			Entrepreneurs hip Yes	Measure Attain of CO Minor Exams, Q demonstrations the videos/ lab, End Exams
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to	V	V	V	V	V		V		V	V	V			Entrepreneurs hip Yes	Measure Attain of CO Minor Exams, Q demonstrations the videos/ lab, End Exams Minor Exams, Q demonstrations the
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution	✓ ✓	√	√ √	 ✓ ✓ 	✓✓		√ √		✓ √	 ✓ ✓ 	 ✓ ✓ 	~	Understanding	Entrepreneurs hip Yes Yes	Measure Attain of CO Minor Exams, Q demonstrations the videos/ lab, End Exams Minor Exams, Q demonstrations the videos/ lab, End Exams
CO:1 apply appropriate characterization techniques for	V	V	√ √	V	✓✓		V		V	 ✓ ✓ 	V			Entrepreneurs hip Yes Yes	Measure Attain of CO Minor Exams, Q demonstrations th videos/ lab, End Exams Minor Exams, Q demonstrations th videos/ lab, End Exams Minor Exams, Q
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution CO:3 determine crystal structure of specimen and estimate its	✓ ✓	√	√ √	 ✓ ✓ 	✓✓		√ √		✓ √	 ✓ ✓ 	 ✓ ✓ 	~	Understanding	Entrepreneurs hip Yes Yes	Measure Attain of CO Minor Exams, Q demonstrations th videos/ lab, End Exams Minor Exams, Q demonstrations th videos/ lab, End Exams Minor Exams, Q demonstrations th
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials. CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution. CO:3 determine crystal structure of specimen and estimate its crystallite size and stress	✓ ✓	√	√ √	 ✓ ✓ 	✓✓		√ √		✓ √	 ✓ ✓ 	 ✓ ✓ 	~	Understanding	Entrepreneurs hip Yes Yes	Measure Attain of CO Minor Exams, Q demonstrations th videos/ lab, End Exams Minor Exams, Q demonstrations th videos/ lab, End Exams Minor Exams, Q
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution CO:3 determine crystal structure of specimen and estimate its crystallite size and stress CO:4 apply thermal analysis techniques to determine thermal	✓ ✓	√ √ √	 ✓ ✓ ✓ 	√ √	✓ ✓ ✓	~	✓ ✓ ✓		√ √ √	√ ✓ ✓	\checkmark	~	Understanding Applying	Entrepreneurs hip Yes Yes	Measure Attain of CO Minor Exams, C demonstrations the videos/ lab, End Exams Minor Exams, C demonstrations the videos/ lab, End Exams Minor Exams, C demonstrations the videos/ lab, End Exams
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution CO:3 determine crystal structure of specimen and estimate its crystallite size and stress CO:4 apply thermal analysis techniques to determine thermal	 ✓ ✓ ✓ 	√	√ √	 ✓ ✓ 	✓✓		√ √		✓ √	 ✓ ✓ 	 ✓ ✓ 	~	Understanding	Entrepreneurs hip Yes Yes Yes	Measure Attain of CO Minor Exams, C demonstrations the videos/ lab, End Exams Minor Exams, C demonstrations the videos/ lab, End Exams Minor Exams, C demonstrations the videos/ lab, End Exams Minor Exams, C
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials. CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution. CO:3 determine crystal structure of specimen and estimate its crystallite size and stress	 ✓ ✓ ✓ 	√ √ √	 ✓ ✓ ✓ 	√ √	✓ ✓ ✓	~	✓ ✓ ✓		√ √ √	√ ✓ ✓	\checkmark	~	Understanding Applying	Entrepreneurs hip Yes Yes Yes	Measure Attain of CO Minor Exams, C demonstrations the videos/ lab, End Exams Minor Exams, C
CO:1 apply appropriate characterization techniques for microstructure examination at different magnification level and use them to understand the microstructure of various materials CO:2 choose and appropriate electron microscopy techniques to investigate microstructure of materials at high resolution CO:3 determine crystal structure of specimen and estimate its crystallite size and stress CO:4 apply thermal analysis techniques to determine thermal	 ✓ ✓ ✓ 	√ √ √	 ✓ ✓ ✓ 	√ √	✓ ✓ ✓	~	✓ ✓ ✓		√ √ √	√ ✓ ✓	\checkmark	~	Understanding Applying	Entrepreneurs hip Yes Yes Yes	Measure Attain of CO Minor Exams, C demonstrations th videos/ lab, End Exams Minor Exams, C demonstrations th videos/ lab, End Exams Minor Exams, C demonstrations th videos/ lab, End

Course Outcome	PO 1	2	PO 3	4	PO 5	PO 6	РО 7	PO 8	РО 9	PO 10	1.10	PO 12	Skill	Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO:1 Generating a good understanding of RP history, its development and applications. Expose the students to different types of Rapid prototyping processes, materials used in RP systems and reverse engineering CO:2 Students will be overceed to different types of the students will be overceed to different types.	V	V		V	V		V	V	~	V	V		Understanding	Yes	Minor Exams, (demonstrations th videos/ lab, End Exams
CO: 2 Students will be exposed to different types of Rapid prototyping processes, materials used in RP systems and reverse engineering.	V	V		V	V	\	V		V	V	V		Understanding	Yes	Minor Exams, Q demonstrations th videos/ lab, End
CO: 3 Students will understand steriolithography methods	V	V		V	V		V	V	V	V	V	V	Understanding	Yes	Exams Minor Exams, Q demonstrations th videos/ lab, End
CO:4 Students gain knowledge to develop prototypes using direct and indriect method of prototyping. MTME-209: Advanced metal cutting		V	V	V	V	~	V		~	V			Understanding	Yes	Exams Minor Exams, Q demonstrations th videos/ lab, End Exams
Course Outcome	100														
LK.G. P.T.U. Mechanical Engineering LK.G. P.T.U. Mechanical Engineering Kapurthala	PO 1	РО 2	РО 3	РО 4	PO 5	РО 6	P0 7	PO 8	90 9	-	PO 11		Skill	Focus on Employability / Entrepreneurs hip	Assessment Too Measure Attain of CO
CO1: Overview of the principles of metal cutting	V	\checkmark	V			V	\checkmark		√	\checkmark	V	V	Understanding	Yes	Minor Exams, Assignments, End
CO 2: Describe the methods of metal cutting	~	V	V			V	V		V	V	\checkmark	V	Understanding	Yes	Exams Minor Exams, Assignments, End
CO 3: Describe the cutting forces involved and their measurements	√	V	V	√			V		V	V	V	V	Understanding and Analysing	Yes	Exams Minor Exams, Assignments, End
CO 4: Describe the parameters effecting tool forces	V	\checkmark	V	V			V		V	V	V	V	Understanding and Analysing	Yes	Exams Minor Exams, Assignments, End
CO 5: Describe the theory/methods to find tool life.	\checkmark	\checkmark	\checkmark	\checkmark								V	Understanding	Yes	Exams Minor Exams,
Paper MTME 210 Advanced Casting Processes													and Analysing		Assignments, End Exams

.

	PO 1	PO 2	PO 3	PO 4	PO 5	РО 6	PO 7	PO 8	90 9	PO 10	1.11	PO 12	Skill	Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO1: Analyze and access the use of casting processes in manufacturing .	V	V	V	V	V	V	V			V	V	V	Understanding	Yes	Minor Exams, (Assignments, End
CO 2: Understand the working of various casting processes.	V	V	V	V	V	V	V			V	V	V	Understanding	Yes	Exams Minor Exams, (Assignments, Enc
CO 3: To inculcate the principle, thermal and metallurgical aspects during solidification of metals & alloys.	V	V	V	V	V	V	V			V	V	V	Applying	Yes	Exams Minor Exams, (Assignments, Enc
CO 4: To impart knowledge about the principles/methods of casting with detailed design of gating/riser system needed for casting.	V	V	\checkmark	V	V	V	V			V	V	\checkmark	Applying	Yes	Exams Minor Exams, C Assignments, Enc
CO 5: To impart knowledge about defects in casting objects and requirements for achieving sound casting.	V	V	V	V	V	\checkmark	V			V	V	\checkmark	Applying	Yes	Exams Minor Exams, Q Assignments, End
MTME-211 :Maintenance and Reliability Engineering Course Outcome							/								Exams
Jourse Outcome	PO 1	РО 2	РО 3	РО 4	PO 5	PO 6	P0 7	PO 8	90 9			-	Skill	Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO1: Understand the concepts of Maintenance, Reliability and Availability.	V	V	\checkmark	V	V	V	V	√	V	\checkmark	1	√	Understanding	Yes	Minor Exams Assignments, End
CO2: Establish maintenance strategies according to system characteristics and design transition	V	V	V	\checkmark	V	V	V	V	V	V	1	√	Understanding	Yes	Exams Minor Exams Assignments, End
programs to implement these strategies.	V	V	\checkmark	√	\checkmark	V	V	\checkmark	V	V	V	V	Applying and Designing	Yeş	Exams Minor Exams Assignments, End
CO3: Develop fault trees for a system and apply various reliability models on fault analysis.	V	V	\checkmark	√	√	\checkmark	V	V	V	\checkmark	V	V	Applying and Designing	Yes	Exams Minor Exams Assignments, End
CO4: Develop hazard rate models to know the behaviour of components.	V	V	\checkmark	1	√	V	V	V	V	V	V	V	Applying and Designing	Yes	Exams Minor Exams Assignments, End
	V	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		Applying and	Yes	Exams Minor Exams
CO5: Manage the manufacturing organisation with highest possible availability. MTME-212 : Supply Chain Management	sal Engi									,			Designing	103	Assignments, End

Course Outcome	PO) PO	PO	PO PO	PO	PO	D PO	PO	PO	PO	PO	PO	Skill	Focus on	Assessment To
)1	2	3	4				8						Employability / Entrepreneurs hip	Measure Attain
CO1: Understand the supply chain performance and supply chain drivers	י י		\checkmark		V	V	∕ √	V	V	V	V	\checkmark	Understanding	Yes	Minor Exams Assignments, End
CO2: Apply the concept of managing economies of scale in a supply chain and importance of											-		'		Exams
transportation in a supply chain.	V	V	V	V	V	V	′ √	V	V	V	V	V	Understanding, Applying	, Yes	Minor Exams Assignments, End
CO3: Learn about the logistics and competitive strategy and measuring logistics costs for its															Exams
performance.	V		V	√ I	V	V	V	V	V	V	V	V	Understanding, Applying	, Yes	Minor Exams Assignments, End
CO4: Apply the concepts of benchmarking in supply chain and coordination in a supply Chain.	V		√	V						V	V	V	Understanding, Applying	, Yes	Exams Minor Exams Assignments, End Exams
CO5: Identify the malfunctions in rotating machinery using vibration measurements.	\checkmark	√	V	V	V	V	V	V	V	V	V	V	Understanding, Applying	Yes	Minor Exams Assignments, End
MTME-214: Engineering Design Optimization			<u> </u>										('		Exams
Course Outcome Department of Mechanical Engineering I.K.G. P.T.U. Main Compus	PO 1	2	PO 3	9 PO 4	PO 5) PO 7	90 8	9 PO	PO 10	PO 11			Focus on Employability / Entrepreneurs hip	Assessment Too Measure Attain of CO
CO1: Describe different methods of optimization	V	\checkmark							V	V	V	V	Understanding	Yes	Minor Exams Assignments, End
CO 2: Model and formulate optimization problems in standard form and assess the optimality of a solution.	\checkmark	\checkmark	V	V	\checkmark				V	V	V	V	Understanding and Analysing	Yes	Exams Minor Exams Assignments, End
CO 3: Determine the optimal solution for unconstrained and constrained problems of multiple															Exams
variables.	V	V	V	V	V				V	V	V	V	Understanding and Analysing	Yes	Minor Exams Assignments, End
CO 4: Analyse the sensitivity of a solution to different variables.	V	V	V	V	V				V	V	V	V	Understanding and Analysing	Yes	Exams Minor Exams Assignments, End
CO 5: Determine the advantages and disadvantages of applying different optimization															Exams

	1 V	\checkmark	$ $ \checkmark	√					\checkmark	√ -	V	V	Understanding	Yes	Minor Exam
	r						()	$\left[\right]$	[]	()	14	1			Assignments, Er
MTME-217 : Dynamics of Rotating Machines	1	1	L		1		<u> </u>	<u> </u>	<u> '</u>						Exams
Course Outcome	PO	PO	PO	PO	PO	PO	PO	PO	PO	100	00	00	Ch-ill		
	1	2	3	4	5	6	7	8	9	1 I				Focus on	Assessment To
	-	- /	- /		-		[]	•	1	(10)	11	12		Employability /	Measure Attain
	1	/	/	1	/	1 /	()		[]	()		1		Entrepreneurs	of CO
		'	L_'		L'	\square'	[]			()		'		hîp	
CO1: Model the Rotor bearing systems and formulate the	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\Box'	\checkmark		\square	\checkmark	\checkmark	\checkmark	Understanding,	Yes	Minor Exam
governing equations.	1	1	4 /		1 /	1 /			1 1		1	$ $	Applying and	103	
000. Compute the authing and do and statistic statist	<u> </u>	<u> </u>	Ļ		<u> </u>	\square'			$(_)$	\square		[]'	Designing		Assignments, End
CO2: Compute the critical speeds and stability limits.	\checkmark	\checkmark	√	\checkmark	\vee	\Box	\checkmark	\square	\square	\checkmark	\checkmark	\checkmark	Understanding,	Yes	Exams Minor Exam
	/ /	1 7	1 2	1	1 '	()	1		()	1	1	()	Applying		Assignments, End
CO3: Compute the transient response of rotors.	+ -	\downarrow	\downarrow	<u> </u>	1_'	<u> </u>	Ļ					\square			Exams
cost compute the transient response or rotors.	$ \vee $	\vee	$ $ \vee	\vee	\checkmark	()	\vee		()	\checkmark	\checkmark	\vee	Understanding,	Yes	Minor Exams
	1 '	1 ?	()	[]	1 7	1 2				1)	[]	Applying		Assignments, End
CO4: Predict the response of a rotor bearing system through	+	+ -	+	1	\vdash	\vdash	\square								Exams
analytical models.	$ $ \vee	\checkmark	$ \vee $	\vee	\vee	()	\checkmark			\checkmark	\checkmark	\checkmark	Understanding,	Yes	Minor Exam
andry ocar models,	1 7	()	()	1	()	1 1						()	Applying		Assignments, End
CO5: Identify the malfunctions in rotating machinery using	$\overline{\mathbf{v}}$	$\overline{\mathbf{v}}$		+	+	1			$ \rightarrow $	⊢ , +		\square			Exams
vibration measurements,	V	V I		\checkmark	√		\checkmark			$ \vee $	\checkmark	\vee	Understanding,	Yes	Minor Exam:
	()			()	()							()	Applying		Assignments, End
MTME 010 - Custoinable Desing and M		1	1	4								4		1	
MTME-219 : Sustainable Design and Manufacturing			4		L		<u> </u>						i		Exams
MTME-219 : Sustainable Design and Manufacturing Course Outcome	PO	PO	P0	P()	PO			20	20		201				
Course Outcome	PO 1	P0 2	PO 3	PO 4				PO					Skill	Focus on	Assessment To
Course Outcome				1 . 1	PO 5	PO 6	PO 7							Employability /	Assessment To Measure Attain
Course Outcome				1 . 1										Employability / Entrepreneurs	Assessment To
Course Outcome				1 . 1										Employability /	Assessment To Measure Attair
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable				1 . 1										Employability / Entrepreneurs	Assessment To Measure Attair
CO1: Understand the concepts of sustainability, sustainable development and linkades between	1		3	1 . 1	5	6								Employability / Entrepreneurs	Assessment To Measure Attain
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable	1 . 1			1 . 1			7	8		10		12	×	Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO1: Understand the concepts of sustainability, sustainable development and linkades between	1		3	1 . 1	5	6	7	8	9	10	11	12		Employability / Entrepreneurs hip Yes	Assessment To Measure Attain of CO Minor Exam
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability.	1 √	2	3	1 . 1	5 √	6	7 √·	8	9	10 √	11 √	12 √	Understanding	Employability / Entrepreneurs hip Yes	Assessment To Measure Attai of CO Minor Exam Assignments, En
CO1: Understand the concept and different tools & techniques of	1 √	2	3	1 . 1	5	6	7 √·	8	9	10 √	11 √	12 √	Understanding	Employability / Entrepreneurs hip Yes	Assessment To Measure Attai of CO Minor Exam Assignments, En Exams
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability.	1 √	2	3	1 . 1	5 √	6	7 √·	8	9	10 √	11 √	12 √	Understanding Understanding,	Employability / Entrepreneurs hip Yes Yes	Assessment To Measure Attai of CO Minor Exam Assignments, En Exams Minor Exam
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkades between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing.	1 √	2	3	1 . 1	5 √	6	7 √·	8	9	10 √	11 √	12 √	Understanding	Employability / Entrepreneurs hip Yes Yes	Assessment To Measure Attain of CO Minor Exam Assignments, En Exams Minor Exam Assignments, En
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing. CO3: Learn about different environmental standards and their	1 √	2	3	1 . 1	5 √	6	7 √·	8	9	10 √	11 √	12 √	Understanding Understanding,	Employability / Entrepreneurs hip Yes Yes	Assessment To Measure Attai of CO Minor Exam Assignments, En Exams Minor Exam
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing. CO3: Learn about different environmental standards and their requirement for sustainable	1 √ √	2 √	3 √ √	1 . 1	5 ✓ ✓	6 ✓ ✓	7 √- √	8	9 √ √	10 ✓	11 √ √	12 √ √	Understanding Understanding, Applying	Employability / Entrepreneurs hip Yes Yes	Assessment T Measure Attai of CO Minor Exan Assignments, Er Exams Minor Exan Assignments, Er
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing. CO3: Learn about different environmental standards and their	1 √	2	3	1 . 1	5 √	6 ✓ ✓	7 √- √	8	9	10 √ √	11 √	12 √ √	Understanding Understanding,	Employability / Entrepreneurs hip Yes Yes	Assessment T Measure Attai of CO Minor Exan Assignments, Er Exams Minor Exan Assignments, Er
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing. CO3: Learn about different environmental standards and their requirement for sustainable	1 √ √	2 √	3 √ √	1 . 1	5 ✓ ✓	6 ✓ ✓	7 √- √	8	9 √ √	10 ✓	11 √ √	12 √ √	Understanding Understanding, Applying	Employability / Entrepreneurs hip Yes Yes Yes	Assessment T Measure Attai of CO Minor Exan Assignments, Er Exams Minor Exan Assignments, Er Exams
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkades between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing. CO3: Learn about different environmental standards and their requirement for sustainable development.	1 √ √	2 √	3 √ √	1 . 1	5 ✓ ✓	6 ✓ ✓	7 √- √	8	9 √ √	10 ✓	11 √ √	12 √ √	Understanding Understanding, Applying Understanding,	Employability / Entrepreneurs hip Yes Yes Yes	Assessment T Measure Atta of CO Minor Exar Assignments, Er Exams Minor Exar Assignments, Er Exams Minor Exan Assignments, Er
Course Outcome Department of Mechanical Engineering CO1: Understand the concepts of sustainability, sustainable development and linkages between technology and sustainability. CO2: Understand the concept and different tools & techniques of sustainable manufacturing. CO3: Learn about different environmental standards and their requirement for sustainable	1 √ √	2 √	3 √ √	1 . 1	5 ✓ ✓	6 ✓ ✓	7 √- √	8	9 √ √	10 ✓ ✓	11 √ √	12 √ √	Understanding Understanding, Applying Understanding,	Employability / Entrepreneurs hip Yes Yes Yes	Assessment T Measure Atta of CO Minor Exar Assignments, Er Exams Minor Exar Assignments, Er Exams

making in sustainability.	5	V	V	√	V	V	V	V	√	√	V	51	Understanding, Applying	, Yes	Minor Exams Assignments, End
CO5: Understand the environmental, economic, societal and		1	-	-	-		-					-		1	Exams
business indicators of													1	1	
sustainability.	V	V	V	V	V	V	V	V	V	√	V	V	Understanding, Applying	, Yes	Minor Exams Assignments, End
MTME-220 Vibration and Noise Control									-	-	1	-	1		Exams
Course Outcome	PO 1	2	3	9 PO 4	5	6 6) PO 7	8 8) PO 11			Focus on Employability / Entrepreneurs hip	
CO1: Understand the multi-degree freedom system and concept of free and forced vibrations	√	V	V		V		V	V		V	V		Understand	Yes	Minor Exams Assignments, End Exams
CO2: Understand the implementation of different numerical methods of multi-degree system.		V		V	V		V	V	V		V	V	Understand	Yes	Minor Exams Assignments, End
CO3: Learn about the concepts regarding vibration of strings, bars, shafts and beams.	V		V	V	V		V	V	V	V	V		Understand	Yes	Exams Minor Exams Assignments, End
CO4: Understand the concept of vibration control and measurement, vibration isolation, vibration exciters and vibration absorbers.			V		V	V			V	V		V	Understand	Yes	Exams Minor Exams Assignments, End
CO5: Learn about fundamentals of noise measurement and noise control.	V	\checkmark	\checkmark		V	V	V		V	V		V	Applying and Designing	Yes	Exams Minor Exams Assignments, Enc
MTME-221 COMPOSITE MATERIALS				-					<u> </u>		<u> </u>	1	1	1	Exams
Course Outcome	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	Skill	Focus on	Accessment To
Department of Mechanical Engineeting I.K.G. P.T.U. Alder Compus Kapurthale	1	2	3	4	5	6	7	8	9		11			Focus on Employability / Entrepreneurs hip	
CO1: Describe the concept, need and applications of composite materials.	V	V		V	V	V	V		V	V	V	V	Understanding, Applying and Designing	, Yes	Minor Exams Assignments, End
CO 2: Solve the problem of effects of influencing factors on the strength of composite materials	\checkmark	\checkmark	V	V	V	V	V	V	V		V	V	Understanding, Applying	Yes	Exams Minor Exam Assignments, End
CO3: Demostrate the various manufacturing processes of the composites	V	V		V	V	V	V		1	V	V	V	Understanding, Applying		Exams Minor Exam Assignments, End Exams

CO 4:Suggest/select optimum combination of Matrix/Reinforcement for various engineering applications.	\int_{1}^{1}		V	V	V	V	V	√	√	√	V	\mathbb{Z}^{\vee}	Understanding, Applying	, Yes	Minor Exam Assignments, End
Design of Steam Turbines MTME-224			-					L	L	_	<u></u>	_			Exams
Course Outcome	P0 1	2	3	4) PO 5			90 8			_	D PO L 12		Focus on Employability / Entrepreneurs hip	
CO:1 Students will be able to practice the basic concepts and working cycles for steam engines.	V			V					5				Understanding	Yes	Minor Exams, demonstrations t videos/ lab, End Exams
CO:2 Student will be able to design the blades and impeller for impulse and reaction turbines.	V			~			V						1,7,5	Yes	Minor Exams demonstrations t videos/ lab, End Exams
CO:3 Student will be able to identify and make different types of condensers, cooling water calculations etc. MTME-225 Convective Heat Transfer	V	V	V	V	V	V		√	V	V		√	Applying	Yes	Minor Exams, demonstrations t videos/ lab, End Exams
Course Outcome	190	Ino	100	100	100	100	120	120	1.20	1-+	1.2.0	1.7.4			11
Department of Mechanical Engineeting I.K.G. P.T.U. Made Compus Kaperihala	PO 1	2	3	PO 4	PO 5	6 6	PO 7	PO 8			PO 11			Focus on Employability / Entrepreneurs hip	Assessment To Measure Attain of CO
CO1: Development of 3D-unsteady (generalized) momentum, energy and mass transfer equations in the Cartesian system, representing them in tensor and vector notations, expandable to other coordinate systems.		V	V		V		V	V		V	V	V	Understand	Yes	Minor Exan Assignments, En Exams
CO2: Development of generalized Integral form of Momentum and energy equations, identification of the displacement, momentum, conduction and enthalpy thicknesses, solutions for variable free stream velocities over curved surface	V	V		V	V		V	V	V		V	V	Understand	Yes	Minor Exam Assignments, En Exams
CO3: Analysis of momentum and energy boundary layers in pipe flows, identification of entrance and fully developed region during laminar flow, solution of energy differential equations for constant heat flux and constant wall temperature conditions			V	V			V	V	V	V	V		Applying and Designing	Yes	Minor Exan Assignments, Er Exams
CO4: Modelling of external and internal natural convective flows and estimates of heat transfer.	V	\checkmark	V		V	\checkmark	\checkmark		.√	V		V	Applying and Designing	Yes	Minor Exan Assignments, Er

CO5: Knowledge of turbulent heat convection, rules to modify	17	17		1	1 1	1.7	1			r	-	-	y		
the laminar momentum and energy equations and develop equations for the turbulent flows.	T∧. T∧.	V	V		V	V	V		V	V	Ć	}√.	Applying and Designing	Yes	Minor Exams Assignments, End
CO6: Analyze heat exchanger performance by using the method of heat exchanger effectiveness.	V	V	V		V	V	V		V	V		V	Applying and Designing	Yes	Exams Minor Exams Assignments, End
Combustion Engineering MTME-226		-	1			L				I					Exams
Course Outcome	P0 1	2	PO 3	РО 4	PO 5	PO 6	PO 7	P0 8	РО 9			PO 12	Skill	Focus on Employability / Entrepreneurs hip	Assessment Too Measure Attain of CO
CO: 1 Understand precisely a difference between premixed combustion and diffusion combustion.	V	V	V	V	V		V		V	V		V	Understanding	Yes	Minor Exams, Q demonstrations th videos/ lab, End
CO:2 Learn combustion mechanisms of gaseous, liquid and solid fuels	V	V	V	~	V		V		V	V	V	V	Understanding	Yes	Exams Minor Exams, Q demonstrations th videos/ lab, End
CO: 3 Learn chemiluminescence phenomena of flame and the prevention method of air pollutant	V	V	V	V	V		V		V	V	V	V	Understanding	Yes	Exams Minor Exams, Q demonstrations th videos/ lab, End
MTME-227 Conductive & Radiative Heat Transfer Course Outcome		r													Exams
Depertment of Mechanical Engineering	РО 1	PO 2	РО 3	РО 4	РО 5	PO 6	РО 7	90 8	9 9	PO 10		PO 12	Skill	Focus on Employability / Entrepreneurs hip	Assessment Too Measure Attain of CO
CO1: Calculate emission of thermal radiation from a black body or grey body.		V	\checkmark		V		V	V		V	V	~	Applying and Designing	Yes	Minor Exams Assignments, End
		1									-				Exams
CO2: Calculation of view factor between two objects.	V	V		V	\checkmark		V	V	V		V	V	Applying and Designing	Yes	Minor Exams, Assignments, End
CO3: Analyse simple radiation interchange between diffuse surfaces, radiation from a volume to a surface and an object with radiation. convection and conduction.	V		V	√	~		√ √	\checkmark	√	V	 ✓ 	~		Yes	Minor Exams Assignments, End Exams Minor Exams Assignments, End
CO3: Analyse simple radiation interchange between diffuse surfaces, radiation from a volume to a surface and an object with radiation. convection and conduction. CO4: Understand the fundamentals of convective heat transfer process.	 ✓ 	V	V		 ✓ ✓ 	√				√ √		√ √	Designing Applying and		Minor Exams Assignments, End Exams Minor Exams Assignments, End Exams Minor Exams Assignments, End
CO3: Analyse simple radiation interchange between diffuse surfaces, radiation from a volume to a surface and an object with radiation. convection and conduction. CO4: Understand the fundamentals of convective heat transfer	V				 ✓ ✓ 	√ √	V		√				Designing Applying and Designing	Yes	Minor Exams, Assignments, End Exams Minor Exams, Assignments, End

Course Outcome	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	Skill	Focus on	Assessment Too
	1	2	3	4	5	6	7	8	9	10			JKII	Employability / Entrepreneurs hip	Measure Attaine of CO
CO1: Describe the requirement specifications for indoor air quality, energy supply and energy use.	V	V	V		V		V	V		V	V		Applying and Designing	Yes	Minor Exams Assignments, End Exams
CO2: Describe system solutions for renewable energy production and heat storage		V		V	V		V	V	V		V	V	Applying and Designing	Yes	Minor Exams Assignments, End Exams
CO3: Describe system solutions for ventilation and tempering of rooms	V		V	V	V		V	V	V	\checkmark	V		Applying and Designing	Yes	Minor Exams Assignments, End
CO4: Describe solutions for domestic hot water supply, sewerage and preparation of domestic hot water methods	√	V	V		V	V	V		V	V		V	Understand	Yes	Exams Minor Exams Assignments, End Exams
CO5: Describe the components of HVAC system.	V	V	V		V	V	V		V	V		V	Applying and Designing	Yes	Assignments, End Exams Exams
CO6: Describe the content of solutions for monitoring and control of air conditioning plants		V	\checkmark		√	\checkmark	V		V	V	V	V	Applying and Designing	Yes	Minor Exams, Assignments, End
Design and optimization of Thermal Systems MTME-230															Exams
Course Outcome	PO 1	PO 2	3	PO 4	PO 5	PO 6	РО 7	PO 8	90 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepreneurs hip	Assessment Too Measure Attain of CO
CO:1 Integrate thermal component models and simulate a thermal system	√	V	~	~	~		~		V	V	V	~	Understanding	Yes	Minor Exams, Q demonstrations the videos/ lab, End
CO:2 Perform an economic analysis of a thermal system.	V	V	V	V	V		√		V	V	V	V	Applying	Yes	Exams Minor Exams, Q demonstrations the videos/ lab, End
CO:3 Use the computer to solve thermal system models	V	~	V	V	V		√		V	V	V	V	Applying	Yes	Exams Minor Exams, Q demonstrations the videos/ lab, End
CO:4 Communicate thermal system designs both orally and in writing	V	V	V	√	V		V		V	V	V	V	Understanding	Yes	Exams Minor Exams, Q demonstrations the videos/ lab, End
Dependent of Mechanical Englishing				2					C.				s		Exams

CO:5 Apply optimization procedures and design optimized thermal	21	\checkmark	✓	V	V		\checkmark		\checkmark	V	V	V	Applying	Yes	Minor Exams,
systems											-	1			demonstrations videos/ lab, En
MTME-301 :Project				1	1							4			Exams
Course Outcome	PO	PO	PO) PO	PO	PO	PC	IPC	PO	-Inc	Inc	PO			
	1	2						8				12		Focus on Employability / Entrepreneurs hip	Assessment To Measure Attai
CO1: Identify an engineering problem, devise a means of solving and exhibit the ability to execute the solution.	V	V	V	V	V	V	V	V	V		V	V	Understanding	y Yes	Reports, Pro Presentations ar
CO2: Demonstrate knowledge of professional and ethical responsibilities	V		V	V	V	V	V	V	V	V	V	V	Applying and Designing	Yes	Viva Reports, Pro Presentations ar
CO3:Formulate and implement innovative ideas for social and environmental benefits.	V		V	2				1		V	V	V	Applying and Designing	Yes	Viva Reports, Pro Presentations a
CO4: Write technical report of the project apart from developing a presentation.		V		V	V	V	V	V	V	V	V	V	Applying and Designing	Yes	Viva Reports, Pro Presentations a
CO5: Demonstrate an ability to present and defend their research work to a panel of experts. Paper MTME404 Dissertation	V		V		V	V	V		V	V	V	V	Applying and Designing	Yes	Viva Reports, Pr Presentations a
Course Outeeme					-					******				L	Viva
Congrimment of Mechanical Engineeting LK.G. P.T.U. Media Compus Kopurtinatio	1	PO 2	PO 3	4 9 9	PO 5	PO 6	PO 7	PO 8							Assessment T Measure Atta of CO
CO1: Demonstrate a depth of knowledge of Mechanical Engineering.	V	\checkmark	V	V	V	V	V	V	V	V	V	V	Understanding	Yes	Field Project, Making a
CO 2: Complete an independent research project, resulting in at least a thesis publication, and research outputs in terms of publications in high impact factor journals, conference proceedings, and patents	V		V	V	\checkmark	V	V	V	V	V	V	V	Applying	Yes	Presentat Field Project, Making a Presentat
chosen field of research.	V		\checkmark	V	V	V	V	V	V	V	V	V .	Understanding	Yes	Field Project, Making a
CO4: Demonstrate an ability to present and defend their research work to a panel of experts.	V	\checkmark	V	V	V	V	V	V	V	V	V	\checkmark	Understanding	Yes	Presentat Field Project, Making a Presentat

Course Outcome	P0 1	PO 2	PO 3	РО 4	РО 5	P0 6	РО 7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Formulate a research problem	V	\checkmark	\checkmark	\checkmark	\checkmark	√	\checkmark	V	\checkmark		V	\checkmark	Understand	Yes	Minor Exams, Assignments, En Term Exams
CO 2: Explain the different experimental designs and their analysis.	V	√	V	V	v	V	V	V	\checkmark	V	\checkmark	\checkmark	Understand	Yes	Minor Exams, Assignments, Er Term Exams
CO 3: Apply different statistical tools for the research analysis	\checkmark	\checkmark	√	V	V	√	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	Applying and Designing	Yes	Minor Exams, Assignments, Er Term Exams
CO 4: Apply the research ethics Non Conventional Machining (PhD Court	V		V	V	V	\checkmark	V	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	Applying and Designing	Yes	Assignments, Presentations ar Final Viva
Course Outcome	PO 1	PO 2		P0 4	PO 5	P0 6	P0 7	PO 8	РО 9	PO 10	PO 11	11-2-2-4	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Understand the need of Non Conventional Machining Processes and able to Classify various processes.	\checkmark	V	V		V		~	V	V	~		\checkmark	Understand	Yes	Minor Exams, Assignments, Er Term Exams
CO2: Recognize the role of mechanical energy in non-Conventional machining processes.		V		√			~	√	V		V	\checkmark	Understand	Yes	Minor Exams, Assignments, Er Term Exams
CO3: Apply the knowledge on machining electrically conductive material through electrical energy in non-Conventional machining processes.	~		V	V		V	√	V		V	V		Applying and Designing	Yes	Minor Exams, Assignments, Er Term Exams
CO4: Understand the concept of machining the hard material using chemical energy andelectrochemical energy.		~	\checkmark				√	√	~	~		~	Applying and Designing	Yes	Assignments, Presentations an Final Viva
CO5: Apply the knowledge on machining electrically conductive material through electrical energy in non-Conventional machining processes.		C BOKS	D Derking C P	D nt of W T 11	<mark>ev</mark> ia 1753	ical E Gamp	ngi∕rea ius	ing	~	v		v	Applying and Designing	Yes	Minor Exams, Assignments, En Term Exams

	2		T	<u> </u>	T		T-	1							
CO6: Familiarity and application of various thermal energy based non-conventional machining processes.	v		V	V	-} √	V	V	V	V	V		V	Applying and Designing	Yes	Minor Exams, Assignments, En Term Exams
PhD Paper Presentation/Seminar															
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8			PO 11		CLIII	Focus on Employability / Entrepreneurship	Assessment Tools to Measur Attainment of CO
CO1: Deal with nerves and think more positively about public speaking.	V	V	V		V	V	V	V	\checkmark	V	′ √	\checkmark	Thinking	Yes	Field based assignments, Repor making, presentations etc.
CO 2: Consider ways of grabbing the listener's attention, holding their interest, and concluding strongly.	~		V			V	V	V	V	V	· v	√	Thinking	Yes	Field based assignments, Repor making, presentations etc.
CO3: Use body language and tone of voice to enhance their presentations.			V		V	V	V	V	V	\checkmark	· V	V	Applying	Yes	Field based assignments, Repor making, presentations etc.
CO4: Use slides and visual aids effectively.	V	\checkmark	\checkmark		V	V	V	V	\checkmark	V	\checkmark	\checkmark	Applying	Yes	Field based assignments, Repor
CO5: Deliver an enthusiastic and well- practised presentation.	\checkmark	√	\checkmark		\checkmark	\checkmark	\checkmark	V	V	\checkmark	√	\checkmark	Applying	Yes	making, presentations etc. Field based assignments, Repor making, presentations etc.
Advanced Heat Transfer															making/ presentations can
I.K.G. P.T.U. Main Compus	PO 1	PO 2	PO 3	РО 4	PO 5	P0 6	P0 7	РО 8	1 1	PO 10		PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measur Attainment of CO
CO1: Understand the principles of heat transfer through conduction, convection and radiation modes.	V	V	√		V	V	V		V	V	V	V	Thinking	Yes	Field based assignments, Repor making, presentations etc.
CO2: Understand the heat transfer during phase-change processes, such as boiling and condensation.	~	\checkmark	√.,			v		\checkmark	~	V	V	V	Thinking	Yes	Field based assignments, Repor making, presentations etc.
CO3: Understand the practical aspects of the theories of heat transfer, such as design of heat exchangers.	V		~		V	V	V	V	√		~	V	Applying	Yes	Field based assignments, Repor making, presentations etc.
CO4: Understand the concept related to mass transfer and its connection with heat transfer.		V	V		\checkmark	V	√.	V		\checkmark	V	\checkmark	Applying	Yes	Field based assignments, Repor making, presentations etc.

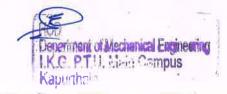
| | √ | √ | Ć | $\mathbf{v}_{\mathbf{l}}$ | √
 | √ | √
 | √ | √
 | | √
 | Applyin
 | Yes | Field based assignments, Report making, presentations etc. |
|---------|----------------------------------|---|--|--
--
--|--|--
--

--
--|---|--|
| | | | | |
 | |
 | |
 | |
 |
 | | |
| PO
1 | РО
2 | PO
3 | РО
4 | PO
5 | PO
6
 | РО
7 | PO
8
 | РО
9 | PO
10
 | PO
11 | PO
12
 | Skill
 | Focus on
Employability /
Entrepreneurship | Assessment Tools to Measu
Attainment of CO |
| V | V | V | | V | V
 | V |
 | V |
 | V | ~
 | Understanding
 | Yes | Field based assignments, Repo
making, presentations etc. |
| V | | V | | |
 | | V
 | V | V
 | V | V
 | Thinking
 | Yes | Field based assignments, Repo
making, presentations etc. |
| | | V | | V | V
 | V | V
 | V |
 | V | v
 | Applying
 | Yes | Field based assignments, Repo
making, presentations etc. |
| | \checkmark | V | | \checkmark | \checkmark
 | \checkmark | \checkmark
 | | \checkmark
 | \checkmark | \checkmark
 | Understanding
 | Yes | Field based assignments, Repo
making, presentations etc. |
| V | V | V | | V | v
 | V |
 | V | √
\
 | |
 | Applying
 | Yes | Field based assignments, Repo
making, presentations etc. |
| | | I | | |
 | |
 | |
 | |
 |
 | | |
| РО
1 | PO
2 | PO
3 | PO
4 | PO
5 | P0
6
 | РО
7 | PO
8
 | PO
9 | PO
10
 | PO
11 | PO
12
 | Skill
 | Focus on
Employability /
Entrepreneurship | Assessment Tools to Measu
Attainment of CO |
| V | | ~ | \checkmark | V | V
 | √ |
 | V | \checkmark
 | v | V
 | Thinking
 | Yes | Field based assignments, Repo
making, presentations etc. |
| V | | ~ | | | √
 | | v
 | v | √
 | √ | √
 | Designing
 | Yes | Field based assignments, Repo
making, presentations etc. |
| | V | ~ | √ | V | v
 | √ | √
 | ~ |
 | | √
 | Applying
 | Yes | Field based assignments, Repo
making, presentations etc. |
| | 1
✓
✓
✓
PO
1
✓ | PO PO 1 PO √ √ √ √ √ √ √ √ √ √ PO PO √ √ √ √ √ √ √ PO √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ | PO PO PO 1 2 90 \checkmark PO PO PO 1 PO PO \checkmark | PO PO PO PO \checkmark PO $?$ \checkmark \checkmark PO $?$ \checkmark \checkmark PO $?$ $?$ \checkmark | PO PO <t< td=""><td>PO PO PO PO PO PO PO PO G \checkmark PO PO PO PO PO \land \checkmark PO PO PO PO PO \bullet \checkmark \land \checkmark \checkmark</td><td>PO PO PO PO PO PO PO PO PO \checkmark \checkmark</td><td>PO PO PO 3 PO PO PO 6 7 PO \checkmark \checkmark</td><td>PO PO <t< td=""><td>PO PO <t< td=""><td>PO PO PO SO PO V<td>PO PO <t< td=""><td>PO PO PO</td><td>P0P0P0P0P0P0P0P0P0P0P0P11112SkillFocus on
Employability /
Entrepreneurship\checkmark</td></t<></td></td></t<></td></t<></td></t<> | PO PO PO PO PO PO PO PO G \checkmark PO PO PO PO PO \land \checkmark PO PO PO PO PO \bullet \checkmark \land \checkmark | PO PO PO PO PO PO PO PO PO \checkmark | PO PO PO 3 PO PO PO 6 7 PO \checkmark | PO PO <t< td=""><td>PO PO <t< td=""><td>PO PO PO SO PO V<td>PO PO <t< td=""><td>PO PO PO</td><td>P0P0P0P0P0P0P0P0P0P0P0P11112SkillFocus on
Employability /
Entrepreneurship\checkmark</td></t<></td></td></t<></td></t<> | PO PO <t< td=""><td>PO PO PO SO PO V<td>PO PO <t< td=""><td>PO PO PO</td><td>P0P0P0P0P0P0P0P0P0P0P0P11112SkillFocus on
Employability /
Entrepreneurship\checkmark</td></t<></td></td></t<> | PO PO PO SO PO V <td>PO PO <t< td=""><td>PO PO PO</td><td>P0P0P0P0P0P0P0P0P0P0P0P11112SkillFocus on
Employability /
Entrepreneurship\checkmark</td></t<></td> | PO PO <t< td=""><td>PO PO PO</td><td>P0P0P0P0P0P0P0P0P0P0P0P11112SkillFocus on
Employability /
Entrepreneurship\checkmark</td></t<> | PO PO | P0P0P0P0P0P0P0P0P0P0P0P11112SkillFocus on
Employability /
Entrepreneurship \checkmark |

CO4: To understand the application and use of the FE method for heat transfer problems		V	V	V]√	V	V	V		V	V	V	Understanding	Yes	Field based assignments, Repo making, presentations etc.
CO5: Use the commercial FEA packages like ANSYS and modern CAD/CAE tools for solving real life structural problems.	V	v	V		V	V	V	V	V	v		V	Applying	Yes	Field based assignments, Repo making, presentations etc.
Composite Materials															
Course Outcome	P0 1	P0 2	PO 3	PO 4	PO 5	P0 6	PO 7	PO 8	РО 9	PO 10	PO 11	P0 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Describe the concept, need and applications of composite materials.			V	V	V	V	V		V	V	V	V	Thinking	Yes	Field based assignments, Repo making, presentations etc.
CO 2: Solve the problem of effects of influencing factors on the strength of composite materials	V		V			\checkmark	•	V	\checkmark	V	V	V	Designing	Yes	Field based assignments, Repo making, presentations etc.
CO3: Demonstrate the various manufacturing processes of the Metal/ ceramic/polymer-based composites.	V	V	V	V	V	\checkmark	V	V	V		V	V	Applying	Yes	Field based assignments, Repo making, presentations etc.
CO 4: Test and characterize the composite and suggest secondary processing as per application.	V	V	V		V	V	V	\checkmark		V	V	V	Understanding	Yes	Field based assignments, Repo making, presentations etc.
Optimization Techniques															
Course Outcome	РО 1	PO 2	PO 3	РО 4	PO 5	РО 6	РО 7	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Ability to apply the theory of optimization methods and algorithms to develop and for solving various types of optimization problems	V		V	V	V	V	√s		V	V	v	v	Thinking	Yes	Field based assignments, Repo making, presentations etc.
CO2: Ability to go in research by applying optimization techniques in problems of Engineering and Technology		~	V			V		V	V	V	V	V	Designing	Yes	Field based assignments, Repo making, presentations etc.

	-	-													
CO3: Ability to solve the mathematical results and numerical techniques of optimization theory to concrete Engineering problems by using computer software.	v	V	V	v v	√	\checkmark	V	V	V		√	V	Applying	Yes	Field based assignments, Reparents, Reparent Making, presentations etc.
Computer Aided Design and Manufactu	ring	(CA	D/C	AM)											
Course Outcome	PO 1	PO 2	PO 3	РО 4	PO 5	РО 6	РО 7	PO 8	PO 9	PO 10		P0 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Apply/develop solutions or to do research in the areas of Design and simulation in Mechanical Engineering.	V	V	V	~	V	V	v		V	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO2: Have abilities and capabilities in developing and applying computer software and hardware to mechanical design and manufacturing fields.	V	V	V			V		v	V	V	v	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO3: Review and document the knowledge developed by scholarly predecessors and critically assess the relevant technological issues.			v	V	v	V	V	v	v		V	V	Applying and Designing	Yes	Field based assignments, Repo making, presentations etc.
CO4: Formulate relevant research problems; conduct experimental and/or analytical study and analyzing results with modern mathematical/scientific methods and use of software tools.		V	V	V	V	V	V	V		V	v	V	Applying	Yes	Field based assignments, Repo making, presentations etc.
Advanced Theory of Vibrations															
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	P0 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Recognize the need and measurement of vibration in mechanical systems	V		\checkmark	\checkmark		\checkmark	V		V	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO2: Suggest suitable methods of vibration reduction and absorption	V	V	\checkmark			\checkmark		V	V	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
				-1										LKG. P.T.U. Main	nical Engineering Compus

CO3: Calculate natural frequencies of vibrations		V	√	V	5	√	\checkmark	\checkmark	\checkmark		V	\checkmark	Applying and Designi.	Yes	Field based assignments, Repo
CO4: Distinguish between systems with different degrees of vibration	\checkmark	√	V	V		\checkmark	V	√		V	\checkmark	\checkmark	Applying	Yes	making, presentations etc. Field based assignments, Repo
Tribology	/	L	<u> </u>												making, presentations etc.
Course Outcome	P0 1	РО 2	PO 3	-		PO 6	PO 7	PO 8	PO 9	PO 10		PO 12	CLU	Focus on Employability / Entrepreneurship	Assessment Tools to Measur Attainment of CO
CO1: Be able to know the field of tribology.	\checkmark	√	\checkmark	\checkmark	\checkmark	√			V	√	1	\checkmark	Understand	Yes	Field based assignments, Report
CO2: Be able to know the surface, properties of surface and related instruments	V	V	V		V	V		V	V	V	V	V	Understand	Yeş	Field based assignments, Report making, presentations etc.
CO3: Be able to understand the friction, friction theory and behaviour of metals and non-metals			V	V	V	V		~	V		V	V	Applying and Designing	Yeş	Field based assignments, Report making, presentations etc.
CO4: Be able to understand wear processes, wear theory, behaviour of metals and non-metals and different instruments	5 √	V	\checkmark	V		\checkmark	~	\checkmark		~	\checkmark	\checkmark	Applying	Yes	Field based assignments, Report making, presentations etc.
Thermo Economics and Power Plants									<u> </u>						
Course Outcome	PO 1	РО 2	PO 3	PO 4	PO 5	PO 6	P0 7	PO 8				PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measur Attainment of CO
CO1: Understand and know the requirements for a Thermal Power Plant and Nuclear Power Plant, from sources to consumption and economics of power plants	√.		V	V	V	V	V	v	v	v	~	V	Thiņking	Yes	Field based assignments, Repor making, presentations etc.
CO2: Study and learn the processes and cycles followed in Thermal Power Plants and nuclear power plants and components used in the power plants.	√	V	V		V	v		v	~	v	v	V	Thinking	Yes	Field based assignments, Report making, presentations etc.



	r	· ·	1	-		-									
CO3: Apply the knowledge gained by analyzing the steam power plants, steam generators and gas turbine power plants, to improve the efficiency and reduce the thermal losses.		~	V	 ✓ 	√	V		V	V		V	~	Applying	Yes	Field based assignments, Repo making, presentations etc.
CO4: Apply the knowledge in calculating the Power Load Calculations and Distribution.	V	V	~	\checkmark		V	V	V		V	V	V	Applying	Yes	Field based assignments, Repo making, presentations etc.
Advanced Thermodynamics									1	-					indiang, prosentations etc.
Course Outcome	PO 1	PO 2	P0 3	PO 4	P0 5	PO 6	P0 7	РО 8	РО 9	PO 10	P0 11	PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Describe the various laws of thermodynamics and their applications	V	V		V	V	V	√		.√	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO 2: Explain the concepts of availability and irreversibility with respect to reacting and nonreacting systems.					\checkmark	V			V	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO 3: Describe methods in using equations of potentials, availability, and exergy for thermodynamic analysis.	V	V		v	V	V			V		V	V	Applying and Designing	Yes	Field based assignments, Repo making, presentations etc.
CO 4: Explain the behaviour of gases and chemical equilibrium.	V	V		V		V	V			V	V	√	Applying	Yes	Field based assignments, Repo making, presentations etc.
Presentation/Seminar															
Course Outcome	P0 1	PO 2	PO 3	РО 4	PO 5	РО 6	РО 7	PO 8	РО 9	PO 10	P0 11		Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measur Attainment of CO
CO1: Deal with nerves and think more positively about public speaking.		\checkmark	V	V	V	V	V		V	V	V	V	Thinking	Yes	Field based assignments, Repo making, presentations etc.
CO 2: Consider ways of grabbing the listener's attention, holding their interest, and concluding strongly.	V				V	V			\checkmark	\checkmark	V	\checkmark	Thinking	Yes	Field based assignments, Repo making, presentations etc.
CO3: Use body language and tone of voice to enhance their presentations.	√	V	√	V	\checkmark	\checkmark			\checkmark		V	\checkmark	Applying	Yes	Field based assignments, Repo making, presentations etc.

 \mathbf{r}_{i}

CO4: Use slides and visual aids effectively.	√	√	√	Y	5	√	√			√	√	√	Applyin	Yes	Field based assignments, Repo
Production Engineering	r														making, presentations etc.
Course Outcome	P0 1	P0 2	PO 3	PO 4	PO 5	P0 6	P0 7	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Understand the various Conventional and Non-Conventional machining processes	V		V	V	V		V		V	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO2: Learn about measuring equipment, error types and their evaluation	V	V	V	V	s√				V	V	V	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO3: Learn about process capability and six sigma		√	V	√	V				\checkmark		V	\checkmark	Applying and Designing	Yes	Field based assignments, Report making, presentations etc.
CO4: Learn about quality control and quality assurance systems	V	V	V	√			V			\checkmark	V	\checkmark	Applying	Yes	Field based assignments, Report making, presentations etc.
Advanced Mechanics of Solids															
Course Outcome	P0 1	РО 2	PO 3	РО 4	PO 5	P0 6	РО 7	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu Attainment of CO
CO1: Understand concepts of stress and strain in solids and associated theories of failure.	V		V	\checkmark	V		V	-	V	V	V	\checkmark	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO2: Derive governing equations to solve engineering problem.	V	V			√				V	V	\checkmark	V	Understand	Yes	Field based assignments, Repo making, presentations etc.
CO3: Apply analysis techniques to determine stress in components such as shafts, beams, shells and rotating discs under different loading conditions.		~	V	V	V				V		√	V	Applying and Designing	Yes	Field based assignments, Repo making, presentations etc.
CO4: Analyze deformations in beam and locate shear centre in thin-walled beams.	V	V	V	V			\checkmark			V	√ 1	\checkmark	Applying	Yes	Field based assignments, Repo making, presentations etc.
Mechatronics								I							monthly presentations etc.
Course Outcome	РО 1	РО 2	PO 3	РО 4	PO 5	P0 6	P0 7	PO 8	РО 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measu

V	V	V	5			V	V	\checkmark	V	V	\checkmark	Thinki	Yes	Field based assignments, Repo making, presentations etc.
V	Ý			V			V	V	V	V	V	Thinking	Yes	Field based assignments, Repo making, presentations etc.
	\checkmark	V	V	V						V	V	Applying	Yes	Field based assignments, Report making, presentations etc.
V		V	V			\checkmark	V	V	√	V	√	Applying	Yes	Field based assignments, Report making, presentations etc.
			L						_					morangy presentations etc.
P0 1	PO 2	PO 3	РО 4	PO 5	PO 6	PO 7	PO 8	P0 9	PO 10	PO 11	P0 12	Skill	Focus on Employability / Entrepreneurship	Assessment Tools to Measur Attainment of CO
	V	V	V	V	V	V	\checkmark	\checkmark	V	V	\checkmark	Understand	Yes	Field based assignments, Repor making, presentations etc.
V	V			V	V.		√	~	~	~	√	Understand	Yes	Field based assignments, Repor
·				Ŷ	¥.		Ŷ	v			Ť	onderstand	105	making, presentations etc.
	√ √ ₽0 1	 ✓ ✓ ✓ ✓ ✓ PO PO 2 ✓ ✓ ✓ 	√ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	√ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ PO PO <td>\checkmark \checkmark PO PO</td> <td>\checkmark \checkmark \uparrow \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \uparrow \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark PO 1 \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark I \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark I \checkmark <</td> <td>\checkmark \checkmark PO PO<</td> <td>\checkmark \checkmark \checkmark</td> <td>\checkmark \checkmark \checkmark</td> <td>\checkmark \checkmark \checkmark</td> <td>\checkmark \checkmark \checkmark</td> <td>\checkmark</td> <td>$\sqrt{4}$$\sqrt{4}$</td>	\checkmark PO PO	\checkmark \uparrow \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \uparrow \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark PO 1 \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark I \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark I \checkmark <	\checkmark PO PO<	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	$ \sqrt{4} $



PROGRAM OUTCOMES (PO'S)

S. No.	Programme Outcomes	Description
01	Engineering knowledge	Apply basic knowledge of mathematics, science and engineering fundamentals and engineering specializations to the solution of complex engineering problems
02	Problem analysis	Identify, formulate, research literature and analyse complex problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
03	Design/ Development of solutions	Design solutions for complex engineering problems and design system components or processes that meet specific needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
04	Conduct	Investigations of complex problems using research-based and research methods including design of experiments, analysis, and interpretations of data and synthesis of information to provide valid conclusions.
05	Modern tool Usage	Create, select and apply appropriate techniques, resources and modern engineering and IT tools including predictions and modelling to complex engineering activities with an understanding of the limitations.
06	The Engineer and Society	Apply reasoning informed by contextual knowledge to assess societal, health. safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
07	Environment and Sustainability	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
08	Ethics	Apply ethical principles and commit to professional ethics and responsibilities of norms of engineering practice.
09	Individual and team work	Function effectively as an individual, and as a member or leader in diverse team and in multi-disciplinary settings.
10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and with effective reports and design documentation, make effective presentation and receive clear instructions.
11	Project management and Finance	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team manage projects and in multidisciplinary environments.
12	Life-long learning	Recognise the need for and have the preparation and ability to Engage in independent and life-long learning in the broadcast context of technologies.

PROGRAM SPECIFIC OUTCOMES:

- Analyze, design and develop machining systems to solve the engineering problems by integrating thermal, design and manufacturing domains of mechanical engineering.
- Adopt a multidisciplinary approach to solve real-world industrial problems

Scanned by CamScanner

PHXX-18 - Physics & Physics Lab	
D1: To be able to understand the basic principles of Quantum mechanics and to apply these to the second sec	he complex phenomenon of matter radiation interaction
2: To be able to understand the concept of wave packets using Heisenberg's uncertainty princi	ple
3: To be able to apply Schrodinger's wave equations to study the complex physical phenomeno	
4: To be able to understand the structure of crystalline solids by applying knowledge of crystal	
5: To be able to understand the structure of eristaline solids by appring knowledge of erister 5: To be able to understand semiconducting materials by using the concepts of band theory of	
AMXX-18 - Maths-1	30/1801
urse Outcome	
1:Students will be able to remember terminologies and formulae in matrices, complex	
2: Students will be able to understand and interpret the concepts of matrices, complex	
3:Students will be able to understand and interpret the concepts of matrices, complex	The second second and the second s
EE101-18 Basic Electrical Engineering	
Outrease Outreases	
Darse Ourcome D1: Have the knowledge of DC circuits, AC Circuits, basic magnetic circuits, working principles of	f electrical machines, and components of low voltage electrical installations
 Have the knowledge of DC circuits, AC circuits, basic magnetic circuits, working principles of 2: Be able to analyze of DC circuits, AC Circuits 	Ciccultur indennical and compare
 3: Understand the basic magnetic circuits and apply it to the working of electrical 	
achines 0 4: Be introduced to types of wiring, batteries, and LT switchgear.	
ree101-18 Basic Electrical Engineering Lab	
Durse Outcome	
D1: The ability to use common electrical measuring instruments and understand the	
ndamentals of electrical engineering. D 2: The ability to make electrical connections, and measure power, power factor	
sing appropriate equipments. O 3: Have the knowledge of electrical machines, components and their ratings	
O 3: have the knowledge of electrical machines, components and their ratings	
aper BTME101-18 Engineering Graphics & Design	
per BTME101-18 Engineering Graphics & Design	
1: design a system, component, or process to meet desired needs within realistic constraints su	ch as aconomic antitranmental social political athiral health and a fat
anufacturability, and sustainability.	ch as economic, environmental, social, political, etnical, nealth and safety,
2: to prepare to communicate effectively.	
 to prepare to communicate enecuvery. to prepare to use the techniques, skills, and modern engineering tools necessary for engineerin	aring practice
15: to prepare to use the techniques, skins, and modern engineering tools necessary for engineer IPD101-18 Mentoring and professional Development	ting practice.
urse Outcome 1: The student will be able to effectively communicate and present technical material.	
 Ability to think critically and creatively to generate innovative and present definition material. 	
2: Ability to think critically and creatively to generate inflovative and optimum solutions.	cas to optimica process and in the
3: The student will be able to identify, evaluate and synthesise information from a range of sourd 4: Engage in continuous education, training and research, and take control of their own learning	a and overall development.
	and overall development.
CH101-18 - Chemistry -1	- (3
urse Outcome lyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.	The second secon
ionalise bulk properties and processes using thermodynamic considerations.	, entering lighting
onalise bulk properties and processes using thermodynamic considerations.	u lovals in various matters
inquish the ranges of the electromagnetic spectrum used for exciting different molecular energy ionalise periodic properties such as ionization potential, electronegativity, oxidation states and e	vieweis in various spectroscopic techniques.

major chemical reactions that are used in the synthesis of more cules.	
CH102-18 - Chemistry Lab	
purse Outcome	
timate rate constants of reactions from concentration of reactants/products as a function of time	
easure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of	water, etc
Inthesize a small drug molecule and analyse a salt sample	
TAMXX-18 Mathematics II	
ourse Outcome	
01: The mathematical tools needed in evaluating multiple integrals and their usages.	
O 2: The effective mathematical tools for the solutions of differential equations that model physical processes.	
O 3: The tools of differentiation and integration of functions that are used in various techniques dealing engineering problems.	
3TPS101-18 Programming for Problem Solving	
Course Outcome	
To formulate simple algorithms for arithmetic and logical problems.	a service and the service of the ser
To translate the algorithms to programs (in C language).	
To test and execute the programs and correct syntax and logical errors.	
To implement conditional branching, iteration and recursion.	
To decompose a problem into functions and synthesize a complete program using divide and conquer approach.	
To use arrays, pointers and structures to formulate algorithms and programs.	
To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.	
To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple	integration.
BTPS102-18 Programming for Problem Solving Lab	
Course Outcome	
To formulate the algorithms for simple problems	8.3.1.
To translate given algorithms to a working and correct program	
To be able to correct syntax errors as reported by the compilers	
To be able to identify and correct logical errors encountered at run time	
To be able to write iterative as well as recursive programs	
To be able to represent data in arrays, strings and structures and manipulate them through a program	
To be able to declare pointers of different types and use them in defining self referential structures.	
To be able to create read and write to and from simple text files.	
Paper BTMP 101-18 Workshop/Manufacturing Practices	
CO1: gain knowledge of the different manufacturing processes which are commonly employed in the industry, to radicate components	using different materials.
	S.
CO 4: By assembling different components, they will be able to produce small devices of their interest.	
Paper BTHU101-18 English	and the second
Course Outcome	~ ~
The objective of the course is to help the students become the independence used and checking skills	(3)
The objective of the course is to help the students become the integerment users of the students become the integerment users of the students because the students and speaking skills. Students will acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.	- Participant of the second of the
Chudents will be able to understand spoken and whether english and an	Comment of the second s
They will be able to converse fluency.	the second se
Paper BTHU102-18 English Lab	Comme 2
Course Outcome The objective of the course is to help the students become the independent users of English language.	
Course Ouccome the students become the independent users of chylish language.	

tudents will acquire basic proficiency in listening and speaking solls. tudents will be able to understand spoken English language, per sularly the language of their chosen technical field	
BMPD101-18 Mentoring and professional Development	
Course Outcome	
CO1: The student will be able to effectively communicate and present technical material.	
CO2. Ability to think critically and creatively to generate innovative and optimum solutions	
CO3: The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process	engineering design and development.
CO4: Engage in continuous education, training and research, and take control of their own learning and overall developmer Paper BTME301-18 Fluid Mechanics	ent.
Course Outcome	
CO1: Understand the concept of fluids and their properties.	
CO 2: Analy the concept of mulds and their properties.	
CO 2:Apply the concept to solve the problem related to statics, dynamics and kinematics	
CO3: Use and apply dimensional analysis and similitude techniques to various physical	the second s
CO4: Distinguish various types of flows and learn flow measurement methods. BTME302-18 Theory of Machines -1	
Course Outcome	
CO1: Understand constructional and working features of important machine elements.	
CO2: Design belt, rope and chain drives for transmission of motion from one shaft to	
CO3: Identify different Cam and follower pairs for different applications and construct cam	
CO4: Understand the function of brakes, dynamometers, flywheel and governors.	
BTME303-18 : Machine Drawing	
Course Outcome	
CO1: Read, draw and interpret the machine drawings and related parameters.	
CO2: Use standards used in machine drawings of machine components and assemblies.	
CO3: Learn the concept of limits, fits and tolerances in various mating parts	
CO4: Visualize and generate different views of a component in the assembly	
CO5: Use CAD tools for making drawings of machine components and assemblies	
BTME304-18 STRENGTH OF MATERIALS-I	
Course Outcome	
CO1: Understand the concepts of stress and strain at a point, in the members subjected to axial, bending, torsional loads	and temperature character
co 2. Determine principal suesses, maximum shearing suess and their angles, and the stresses acting on any arbitrary pl	and temperature changes.
so s. The bending moment and shear force over the span of various beams subjected to different kinds of loads	ane within a structural element.
CO 4: Calculate load carrying capacity of columns and struts and their buckling strength.	
CO 5: Evaluate the slope and deflection of beams subjected to loads.	
3TME305-18 Basic Electronics Engineering	
Course Outcome	
Inderstand construction of diodes and their rectifier applications.	
ppreciate the construction and working bipolar junction transistors and MOSFETs.	
Design Op-Amp IC based fundamental applications.	
Paper Basic Thermodynamics BTME 305-18	
Course Outcome	i an and distanting
01: Apply energy balance to Systems and Control Volumes in situations involving heat and work interactions.	Martin Contraction of the Contra
O2: Evaluate changes in thermodynamic properties of substances	Charles and the second second
D3: Evaluate performance of energy conversion devices	Carpenter and
04:Explain and apply various gas power and vapor power cycles	

ITME306-18 Strength of Material Lab	
Course Outcome	at the data of high and a set
201: Measure the various mechanical properties such as tensile and compressive strength, impact strength, torsion strength and	d fatique strength and hardness of brittle and ductil
O 2: Calculate load carrying capacity of long columns and their buckling strength.	
8TME307-18 Theory of Machines Lab	
Course Outcome	
CO1: Understand constructional and working features of important machine elements.	
CO2: Design belt, rope and chain drives for transmission of motion from one shaft to	
another	
CO3: Identify different Cam and follower pairs for different applications and construct cam	
profile for required follower motion.	
CO4: Understand the function of brakes, dynamometers, flywheel and governors.	
Paper BTME308-18 Fluid Mechanics Lab	
Course Outcome	
CO1: Distinguish various type of flows and flow measurement methods and concept of	
statics and dynamics of liquids.	
CO 2: Determine discharge and head loss, hydraulic and friction coefficient, for different	
types of flow in pipe and open channels.	
BMPD301-18 Mentoring and professional Development	
Course Outcome	
CO1: The student will be able to effectively communicate and present technical material.	
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.	pering design and development.
CO2: Ability to think critically and creatively to generate inflovative and optimism and datase. CO3: The student will be able to identify, evaluate and synthesise information for the area of sources to optimise process engine	cering acordinate according
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development	
BTME401-18 APPLIED THERMODYNAMICS	
Course Outcome	
CO1: Explain the functioning and performance evaluation of reciprocating air compressors.	
co a Apply the computing phenomenon in boilers and I.C. engines.	
O 4: Demostrate the constructional features and working of steam power plants and to evaluate their performance.	
Paper BTME 402-18 Fluid Machines	
Course Outcome	
CO1: Determine discharge and head loss, hydraulic and friction coefficient, for different types of how in pipe and open chamiles. CO2: Determine discharge and head loss, hydraulic and friction coefficient, for different types of how in pipe and open chamiles. CO2: Know about constructional details, working and design aspects of runner/wheel and evaluate the performance of various tu	urbines like Pelton, Kaplan and Francis.
20 2 Know about constructional details, working and design aspects of remaining the different using change	conditions
O 3: Know about constructional details, working and evaluate the performance of reciprocating nump and evaluate the effect of	f various deviations from the ideal
O 2: Know about constructional details, working and evaluate the performance of centritudal pump under different varie strate CO 3: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional details, working and evaluate the effect of O 4: Know about constructional d	
Core Know about constructional details and working or hydraulie get	
THE TOP TO CTDENCTH OF MATERIALS'II	
	mperature changes.
(1) Understand the concepts of stress and strain at a point, in their angles and the stresses acting on any arbitrary plane will	thin a structural element.
o 2: Determine principal stresses, maximum shears of various beams subjected to different kinds of loads.	(2) -
O1: Understand the concept seases, maximum shearing stress and their angles, and the stresses acting or any action process acting or any action processes acting or acting or	
O 3: Find bending moment and shear force over the span of various beam such as the second sec	Provide and the state of the state of the
	In the second is
0 5: Evaluate the slope and generating	TERLES P. A.M.
ourse Outcome	A CONTRACTOR

BTA

: Illustrate the significance of structure-property-correlation or engineering materials including ferrous and nor errous.	
2: Explain the use and importance of various heat treatments pocesses used for engineering materials and their vactical as including the various and their vactical as including the vactical as includin	antications
3: Identify the various structural chapage occurred the metal constant of the metal	applications.
3: Identify the various structural changes occurred in metals with respect to time temperature transformations.	
4: Interpret the significance of Fe-C and TTT diagram for controlling the desired structure and properties of the materials. ME405-18 : Theory of Machines -II	
purse Outcome	
	and the second
11: Understand the basic concepts of inertia forces & couples applied to reciprocating parts of a machine.	
22: Understand balancing of rotating and reciprocating parts of machines.	
D3: Select suitable type of gears for different application and analyse the motion of different elements of gear trains.	
04: Understand the concept and application of gyroscopic effect.	
O5: Gain knowledge of kinematic synthesis.	Contraction of the second second
VS101-18 ENVIRONMENTAL SCIENCE	
Course Outcome	
Students will enable to understand environmental problems at local and national level through literature and general awarene	ess.
the students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who ha	we done practical work on various environmental Issue
The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore	re the possibilities to mitigate these problems
Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex interconnected	world
BTME406-18 APPLIED THERMODYNAMICS Lab	None
Course Outcome	
CO1: Explain the functioning and performance evaluation of reciprocating air compressors.	
CO 2: Analyze the combustion phenomenon in boilers and LC engines	
CO 3: Use of Steam Tables and MollierChart to solve vapour power cycle problems	
CO 4: Demostrate the constructional features and working of steam power plants and to evaluate their performance.	
Paper BTME407-18 Fluid Machines Lab	
Course Outcome	
CO1: Conduct experiments on scaled down models or on actual size hydraulic machines and evaluate results in terms of unit of 2: Understand the working of united by the destination of the second seco	or coorific quantities for some i
CO 2: Understand the working of various hydraulic machines (turbines and pumps) and can suggest remedial solutions for various	rious faulte
Paper BTME408-18 Material Engineering Lab	nous rauts.
Course Outcome	~
Analyse the microstructure of different ferrous and non-ferrous samples.	
Explore the effect of heat treatment on various engineering materials by analysing its microstructure and hardness	THE .
BMPD401-18 Mentoring and professional Development	Constant of the stand of the based on
Course Outcome	and the second s
CO1: The student will be able to effectively communicate and present technical material.	Cuput de
CO2: Ability to think critically and creatively to generate innovative and ontimum solutions	
CO3: Relative of the second se	
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.	gineering design and development.
BTME501-18 Heat Transfer	
To teach students the basic principles of conduction, radiation, and convection heat transfer. Students will demonstrate an up	Pdorstanding (1)
To teach students the basic principles of conduction, radiation, and convection heat transfer. Students will demonstrate an ur radiation, and convection heat transfer.	inversioning of the basic concepts of conduction,
The data basis principle of conservation of energy to systems that involve conduction radiation and heat transfer of the	
conservation of energy and its application to problems involving conduction, radiation, and/or convection heat transfer. This p	principle will demonstrate an understanding of the concept
Conservation of energy the data and being data and there	principle will be used to formulate appropriate
mathematical models and associated thermal boundary conditions. To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will dem heart transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution tech	
To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will dem heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution tech	

ain students to identify, formulate, and solve engineering publications involving forced convection heat trans emonstrate the ability to formulate practical forced and an ability of a solution built and the solution of the	fer, natural convection heat transfer, and heat exchangers. Students
	tem into a mathematical model, selecting an appropriate solution
ME502-18 : Design of Machine Elements	
L: Demonstrate recalling and applying knowledge of Basic Sciences, Graphics & Drawing, Basic Manufacturi	ng Processes and Material Science, for design procedures of various
chorneal components.	
2: Comprehend the effect of different stresses and strains under various loading conditions on the mechani	cal components and identify the mechanism/mode of failure.
S. Examine and solve design problems involving machine elements on the basis of various theories of failur	
A. Synergize forces, moments and strength information to develop ability to analyze, design and/or select a	nachine elements aiming for safety, reliability, and sustainability.
per princ 505-16 Manufacturing Processes	
ourse Outcome	
01: Understand the different conventional manufacturing methods employed for making different products.	
U 2. Undersiding the different unconventional manufacturing methods employed for making different eredud	5.
aper BIME 503-18 Management & Engineering Economics	
Course Outcome	
01: Explain the development of management and the role it plays at different levels in an organization.	
0 2: Comprehend the process and role of effective planning, organizing and staffing for the development of	an organization.
to 5. Onderstand the necessity of dood leadership, communication and coordination for establishing effective	control in an organization
20 4. Understand engineering economics demand supply and its importance in economics decision making an	d problem solving.
50 J. Calculate present worth, annual worth and IRR for different alternatives in economic decision making	
CO 6: Understand the procedure involved in estimation of cost for a simple component, product costing and d	epreciation, its methods.
Paper BTME 503-18 Heat Transfer Lab Course Outcome	
Design and fabricate the experimental setups related to heat transfer phenomena.	
Measure and analyse different heat transfer parameters.	
Paper BTME 506-18 Manufacturing Processes Laboratory	
Course Outcome	
CO1: Determine/calculate the clay content, moisture content, hardness, permeability and grain fineness num	
CO 2: Use oxy-acetylene gas welding, manual arc welding, MIG, TIG and spot-welding processes to make var	per of moulding sand sample.
CO 3: Use machine tools such as lather shaper and milling machine for machining/cutting various profiles on	
CO 4: Learn about the constructional features and working of grinding machines, hydraulic press, draw bench	work pieces.
Paper BTME 507-18 Numerical Methods Lab	r, rolling mills, drawing and extrusion equipment.
Course Outcome	
Understand different implementation modes of numerical methods.	
Use the numerical methods with the understanding of limitations of these methods for solving problems.	
Develop and implement their own computer programs.	<u></u>
Solve problems more accurately and efficiently in low computational time.	~ ~ ~
Handle the problems conveniently which are difficult to deal with manually	14
Paper BTMC102-18 ESSENCE OF INDIAN KNOWLEDGE TRADITION	A Manufact of Manhamined Earthcase Temp
Course Outcome	The second se
Understand the Philosophy of Indian Knowledge system and and its Basic Structure.	(Transmission
Understand the Ancient India Culture, Society and Religion.	
Examine the areas of Indian Linguistic Tradition.	

now the contrubtion of scientists of different eras.	
andle the problems conveniently which are difficult to deal with an anually	
aper BTME 409-18 4 weeks industrial training	
ourse Outcome	
apability to acquire and apply fundamental principles of engineering.	
ecome master in one's specialized technology	
ecome updated with all the latest changes in technological world.	
pility to communicate efficiently.	d antronyconourship skills
nack to be a multi-skilled engineer with good technical knowledge, management, leadership a	and entrepreneurship skins.
Lith to identify formulate and model problems and find engineering solution based out a SVS	terns approach.
Canability and enthusiasm for self-improvement through continuous professional development	and life-long learning
awareness of the social, cultural, global and environmental responsibility as an engineer.	
BTME601-18 REFREGERATION AND AIR CONDITIONING	
Course Outromo	
	Ing system
CO1: Understand the fundamental principles and applications of retrigeration and all Conductor CO2: The students will be able to obtain cooling capacity and coefficient of performance by co	nducting test on reingeration systems
CO2: The students will be able to obtain cooling capacity and coefficient of performance by CO CO3: The students will develop ability to calculate the energy requirements of cooling and hea co3: The students will develop ability to calculate the energy requirements of cooling issues	t equipment for all conditioning approximation
CO3: The students will develop ability to calculate the property requirements of country and the CO4: The students will be able to Explain the properties applications and enronmental issues	of different refrigerance.
cor, The students can demonstrate an ability to analysis psychrometric processes and everes	of air conditioning systems.
Paper BTME602-18 Mechanical Measurements & Metrology	
C. Arama	
	A Mine
CO 2: To learn about various sensors and transducers used for measurement of meetinging	Jantities
co at To learn about usage of various measuring instruments.	
CO 4: To learn metrology of screw, gear and surface texture.	
BTME603-18 AUTOMOBILE ENGINEERING	
Course Outcome	
CO1: Identify the different parts of the automobile. CO2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steer	ing and the suspension systems.
CO 2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steer	ndustry
	nousuy.
Course Outcome Course Outcome CO1: 1.Understand the complexities associated with management in the organizations and int	egrate the learning in handling these complexities.
Course Understand the complexities associated with management in the organizations and inc	equate the learning in romany a
CO1: 1.Understand the complexities associated with the regime of the roles, skills and functions of management.	
CO 2: 2.Demonstrate the roles, skills and functions of management. CO 3: 3.Understand the concepts related to industrial management.	aller aller
CO 3: 3.Understand the concepts related to industrial managements BTME605-18 REFREGERATION AND AIR CONDITIONING LAB	
BTME605-18 REFREGERATION	ning system
BTME605-18 KET KEGET Course Outcome CO1: Understand the fundamental principles and applications of refrigeration and air condition CO2: The students will be able to obtain cooling capacity and coefficient of performance by co CO2: The students will be able to obtain cooling capacity and coefficient of performance by co	and system
CO1: Understand the fundamental principles and applications and coefficient of performance by co CO2: The students will be able to obtain cooling capacity and coefficient of cooling and her CO3: The students will develop ability to calculate the energy requirements of cooling and her CO3: The students will be able to Explain the properties, applications and enironmental issues	at equipment for air conditioning applications.
CO2: The students will be able to obtain county of a students of cooling and new cooling an	s of different refrigerants.
co3: The students will develop ability reliain the properties, applications and enironmental issues	of air conditioning systems.
coa: The students will be able to apply the applycic psychrometric processes and cycles	
COS. The students can demonstrate the suprements & Metrology Lab	
Paper BTME606-18 Mechanis	dimensions and surface roughness
Course Outcome CO1: Demonstrate the use of instruments for measuring linear (internal and external), angula CO1: Demonstrate the use of instrument and know requirement of calibration, errors in m	ar dimensions and survive road messi
CO1: Demonstrate the use of instruction and know requirement of calibration, errors in m	easurement etc.
COTT - THE PROPERTY MEASURING INSU DITERCENTE	

O 3: Apply analytical and experimental methods to make measurements and to find and correct defects in measurement systems.	
Course Outcome	
O1: Identify the different parts of the automobile.	
O 2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems.	
O 3: Explain the need of vehicle safety systems and future developments in the automobile industry.	
3TME-608-18 : Minor Project	
Course Outcome	
CO1:Identify an open ended problem in area of mechanical engineering which requires further	
CO2: Identify the methods and materials required for the project work. CO3: Manage the work with team members.	
COA. Formulate the work with team members.	
CO4: . Formulate and implement innovative ideas for social and environmental benefits.	
CO5: Write technical report of the project apart from developing a presentation.	
Paper: Internal Combustion Engines 609-18	
Course Outcome	
CO1:Knowledge about the basics of IC engines	
CO2:Ability to evaluate operational characteristics of IC Engines	
CO3:Ability to ascertain the effects of fuel/supply systems on emission from an engine.	
CO4:Ability to test engine performance	
BTME-610-18 Mechatronics Systems	
Course Outcome	
CO1: Design mux, demux, flip-flops, and shift registers.	
CO2: Describe the block diagram, registers, ALU, bus systems, timing & control signals, instruction cycles, and interrupts of 8085 microprocessors.	
CO3: Apply the concept of 8085 microprocessor instruction sets and addressing modes in writing assembly language program for a given problem.	
CO3: Apply the concept of boos microprocessor instruction see the during instruction stepper motor, 8251 and 8253 ICs with 8085 microproces	SSOF
BTME-611-18 Microprocessor in automation	
Course Outcome	
Student is able to describe the architecture and different modes of operations of a typical microprocessor.	a interrupto subroutinos macros
Student is able to understand different addressing modes and instructions of 8086 design and develop assembly language programs using softwa	re interrupts, subroduiles, macros
a line the transforce moment. I/O dovises and interrupt controller with 8086 microprocessors.	
Students in able to describe the internal architecture and different modes of operations of a typical microcontroller	
the set of the set of the second by language programs USING 8051 INCOLOUUUIC	
rs 305.6 Student is able to analyze and compare the features of microprocessors and microcontrollers.	
STME612-18 COMPOSITE MATERIALS	
Durksome	
	the first state of the state of
20.2: Analyze the effects of influencing factors on the strength of composite metericate	
	S 1 1 1 1
Ourse Outcome O1: Create the different wireframe primitives using parametric representations O1: Create the different wireframe primitives using parametric modeling	
01: Create the different wire raine parametric modeling. 02: Create surface primitives using parametric modeling.	
O2: Create surface primitives using parametric modeling. O3: Create the different solid primitives using the different representation schemes	
O3: Create the different solid primitives using the different operation schemes O4: Apply geometric transformations on the created wireframe, surface and solid models.	
204: Apply geometric transformations on the created interesting and a second se	
On the second de Broduct Design & Development	

urse Outcome	
1: Understand desirable design aspects considering under	
1: Understand desirable design aspects considering various reduction processes and also understand the economic factors in the economic factors and the economic factors and the economic factors are aspected as a second	ctors of design.
3: Apply the modern approaches to product docing providers to execute a design from concept to finished product.	the traine methode
4: Apply innovative process techniques in curbinations identify concurrent design, quality function deployment and va	rious rapid prototyping methous.
ME 615-18 : Non Conventional Energy Resources	
ourse Outcome	
11: To Explain renewable energy sources & systems,	
22: To Apply engineering techniques to build solar, wind, tidal, geothermal, biofuel, fuel cell, Hydrogen and sterling engineering and exclusion the implication of the second sterling engineering and exclusion of the implication of the second sterling engineering enginteering engineering engineering engineering engineering en	
33: To Analyze and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to	ine
04: To Demonstrate self -learning capability to design & establish renewable energy systems.	solar radiation geometry one mile en gr
O5: To Conduct experiments to assess the performance of solar PV, solar thermal and biodiesel systems	
THE616-18 : OPERATION RESEARCH	
Course Outcome	
CO1: Explain various mathematical deterministic operation research models.	
CO2: Describe the problems of probabilistic and simulation models.	
CO3: Demonstrate the queuing, inventory and replacement models etc.	
CO4: Formulate and analyze the network models.	
BTME617-18: MAINTENANCE & RELIABILITY	
Course Outcome	
CO1: Understand the concents of reliability and maintainability	
CO2: The students will be able to use statistical tools to characterise the reliability of an item and determine the reliability	of a system, and will also understand the application of
maintenance strategies in a manufacturing environment	
CO3: The students will develop ability in formulating suitable maintenance strategies to enhance system reliability of a maintenance strategies to enhance strat	anufacturing system
Paper BTME701-18 Mechanical Vibrations	
Course Outcome	
CO1: Formulate mathematical models of problems in vibrations using Newton's second law or energy	
CO 2: Understand the need and measurement of vibration in mechanical systems.	
CO 3: Calculate principal modes of vibration.	
CO4: Explore the suitable methods of vibration reduction and absorption.	- AF
CO5: Ability to determine vibratory responses of SDOF and MDOF systems.	264 >
COS: Ability to determine vibratory responses of SDOF and MDOF systems.	
Paper BTME702-18 Automation in manufacturing	ACA :
Course Outcome	
Illustrate the basic concepts of automation in machine tools. Analyze various automated flow lines, Explain assembly systems and line balancing methods.	
	2
	25
Interpret the importance of adaptive control systems/ examples and adaptive control systems/ exa	. 20
BTME703-18 Fundamentals of Fining	
Course Outcome CO1: The students understand the significance of Management in their Profession CO1: The students understand the significance of Management in their Profession	
CO1: The students understand the significance of Management in their Profession CO2: The various Management Functions like Planning, Organizing, Staffing, Leading, aspects are learnt in this course CO2: The various Management Functions like Planning, organizing staffing, Leading, aspects are learnt in this course	na those complexities
CO1: The students understand functions like Planning, Organizing, Staffing, Leading, aspects are learned in this course CO2: The various Management Functions like Planning, Organizing, Staffing, Leading, aspects are learning in handlin CO3: Understand the complexities associated with management in the organizations and integrate the learning in handlin CO3: Understand the complexities and functions of management.	ig these complexities.
CO3. Understand the company of management	and the second se
cost of department the roles, skills and functions of management	
Look, Domonstrate the roles, skills and runcedere	
CO4: Demonstrate the roles, skills and functions of management. BTME-704-18 : Project-II Course Outcome	

CO1: To create an Industrial environment and culture within the institution.	
CO2: To set up production lab utilizing the infrastructure of the extitution.	
CO3: To standardize laboratories to industrial standard, thereby giving exposure to industrial	
housekeeping standards.	
CO4: Demonstrate an ability to present and defend their research work to a panel of experts.	
CO5: Demonstrate knowledge of contemporary issues in their chosen field of research.	
BTME-801 Software/Industrial Training	
Course Outcome	
Capability to acquire and apply fundamental principles of engineering.	
Become master in one's specialized technology	
Become updated with all the latest changes in technological world.	
Ability to communicate efficiently.	
Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	
Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	
Capability and enthusiasm for self-improvement through continuous professional development and life-long learning	
Awareness of the social, cultural, global and environmental responsibility as an engineer	

	Name of Department: Mechanical Department
	Paper: Advanced Engineering Mat als MTME-101-18
	Course Outcome
	CO1: Identify and describe different types of material processing techniques for advanced materials
	CO2: Ability to select suitable material for specific applications
	Finite Element Method
	Course Outcome
	CO1: Explain the principles of vibrations;
	CO1: Explain the principles of vibrations; CO2: Define and describe the concepts of vibration modes and natural frequencies and their measurement and estimation for
	Imulti-degree-of-freedom systems;
	CO3: Explain System Modelling via use of Energy Analysis and its application to complex vibrating systems; CO4: solve linear 2D structural beams and frames problems; 1Dheat conduction and convection heat transfer problems.
	CO5:Recognise the use of different numerical techniques and its application to vibration design;
The second	COS:Recognise the use of other entitient and the appreciation of appreciation of appreciation of the second s
1912	MTME-103 :Advanced Design of Mechanical Systems
30	Course Outcome
	CO1: Learn integrating CAE, CAD, CAM tools. CO2: Learn about proper material selection and know about influence of materials on form design of welded members,
A SEC	forgings and castings.
Can a	CO3: Understand general design principles for manufacturability. CO4: Design to minimize material usage, design for recyclability & energy efficiency and design to regulations and standards.
4	MTME-104 : Operations Management
	Course Outcome CO1: Understand the concepts of operations management and various types of manufacturing systems & plant layouts with
	CO1: Understand the concepts of operations management and various types of management and vari
	their characteristics, merits and demerits.
	their characteristics, merits and dements. <u>CO2: Learn about different types of planning and concepts of MACRO & MICRO process design.</u> <u>CO3: Know about the concepts of demand forecasting, various demand patterns and qualitative and quantitative techniques of</u>
	demand forecasting. CO4: Understand the concept of aggregate production planning, different scheduling criteria and mutli-stage manufacturing
7 G	systems. CO5: Learn about various types of material flow and concepts of MRP, MRP-II, JIT and ERP along with their characteristics.
	MTME-105 ADVANCED THERMODYNAMICS
B.H.	A Aroma
4.1	
	and a provide methods in using equations of potentials, availability, and every for distinguisting analysis.
1	co 4: Applyce the direct energy conversion methods and their applications.
215	MTME 201 RESEARCH METHODOLOGY
20	Course Outcome
	Formulate a research problem
a sincere	Loo as Explain the different experimental designs and their analysis.
	CO 3: Apply different statistical tools for the research analysis
	CO 3: Apply different statistical constraints and the statisti
	MTME-202 Tribology

PE-

	udent will be able to study research papers for understanding of a new field and summarise them.
	to identify promising new directions of various cutting edge technologies.
	: Modern Manufacturing Processes
Course Ou	
LOI: Under	stand the importance and applications of advanced manufacturing processes
	rstand the working principle and theory of material removal of various advanced
machining	
<u>CO 3: Dete</u>	mine the material removal rate and surface finish achieved by various advanced
machining	
CO 4: Unde	rstand the different techniques to form the miniature product from metal powder
CO 5: Lear	n about Additive manufacturing such as 3-D printing
Paper MT	ME204 Computational Fluid Dynamics
Course O	
CO1: Provi	de the student with a significant level of experience in the use of modern CFD software for the analysis of comple
nuid-now :	ystems.
CO 2: Imp	rove the student's understanding of the basic principles of fluid mechanics.
CO 3: 1mp	rove the student's research and communication skills using a self-directed, detailed study of a complex fluid-flow
DI UDIEITI a	in to communicate the results in written form
MTME -2	05: Advanced Welding Technology
Course C	
CO1: Lear	n about the classification of various welding processes, welding defects and their
100 2: UN	erstand the terms weldability, soldering, brazing, welding symbols and safety and
100 3: Uni	lerstand the concept of various terms of welding arc such as arc efficiency, arc forces
LO 4: Lea	rn about the various types of welding electrodes, welding fluxes, shielding gases, AC and
CO 5: Lea	rn about various advanced welding processes along with their advantages, limitations and
Advance	d Material Characterization MTME-207-18
	Dutcome
CO:1 app	ly appropriate characterization techniques for microstructure examination at
different	magnification level and use them to understand the microstructure of various
materials	
CO:2 cho	ose and appropriate electron microscopy techniques to investigate microstructure
lot mater	als at high resolution
CO:3 de	ermine crystal structure of specimen and estimate its crystallite size and stress
CO:4 ap	bly thermal analysis techniques to determine thermal stability of and thermodynamic transitions of the specimen
Rapid	Prototyping MTME-208
Course	Outcome
CO:1 C	enerating a good understanding of RP history, its development and applications. Expose
luie su	dents to different types of Rapid prototyping processes materials used in PP
CO:2	IS and reverse engineering
lin Rr	Students will be exposed to different types of Rapid prototyping processes, materials used
	2003. Auvanced mega Cutting

Contraction of the second

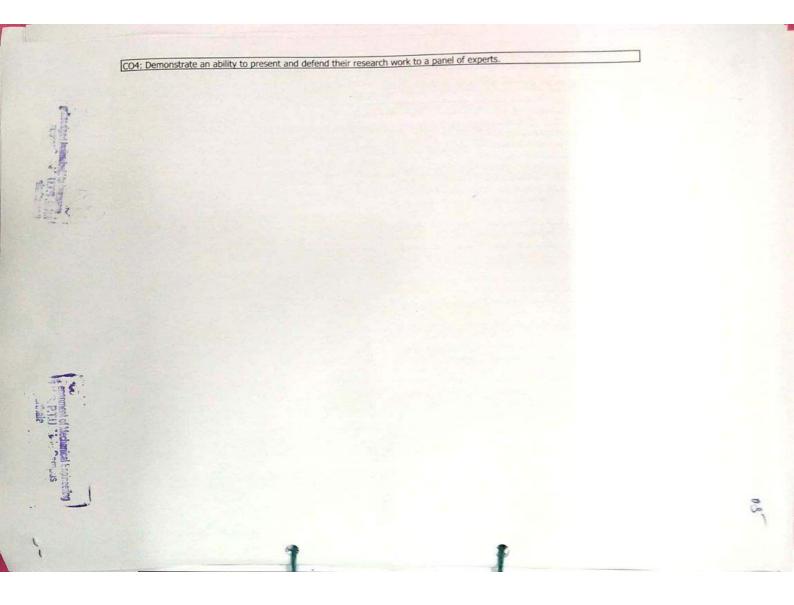
01	rse Outcome
01.	Overview of the principles of metal cutting
02	. Describe the methods of metal cutting
03	Describe the cutting forces involved and their measurements
.04	Describe the parameters effecting tool forces
05	5: Describe the theory/methods to find tool life.
Pap	er MTME 210 Advanced Casting Processes
Cou	Irse Outcome
CO1	: Analyze and access the use of casting processes in manufacturing .
0.	2: Understand the working of various casting processes.
CO	3: To inculcate the principle, thermal and metallurgical aspects during solidification of metals & alloys.
CO	4: To impart knowledge about the principles/methods of casting with detailed design of gating/riser system needed fi
cast	ting.
CO	5: To impart knowledge about defects in casting objects and requirements for achieving sound casting.
MT	ME-211 :Maintenance and Reliability Engineering
Co	urse Outcome
CO	1: Understand the concepts of Maintenance, Reliability and Availability.
CO	2: Establish maintenance strategies according to system characteristics and design transition
Dre	params to implement these strategies.
	3: Develop fault trees for a system and apply various reliability models on fault analysis.
CO	4: Develop hazard rate models to know the behaviour of components.
CO	5: Manage the manufacturing organisation with highest possible availability.
	TME-212 : Supply Chain Management
-	purse Outcome
-	1: Understand the supply chain performance and supply chain drivers
	22: Apply the concept of managing economies of scale in a supply chain and importance of
	insportation in a supply chain.
	33: Learn about the logistics and competitive strategy and measuring logistics costs for its
_	rformance.
	34: Apply the concepts of benchmarking in supply chain and coordination in a supply Chain.
	55: Identify the malfunctions in rotating machinery using vibration measurements.
	TME-214: Engineering Design Optimization
-	ourse Outcome
	1: Describe different methods of optimization
) 2: Model and formulate optimization problems in standard form and assess the optimality of a solution.
	3: Determine the optimal solution for unconstrained and constrained problems of multiple
	inables.
CC	O 4: Analyse the sensitivity of a solution to different variables.
CC	5: Determine the advantages and disadvantages of applying different optimization
te	chniques for a specific problem.
M	TME-217 : Dynamics of Rotating Machines
	ourse Outcome
TCC	 Model the Rotor bearing systems and formulate the governing equations.
120	D2: Compute the critical speeds and stability limits.

-

Strue . . .

US: Comp	t the response of a rotor bearing system through analytical models.
CO4: Predic	fy the malfunctions in rotating machinery using vibration measurements.
CO5: Identi	the malfunctions in rotating machinery using violation measurements
	: Sustainable Design and Manufacturing
Course Ou	tcome
CO1: Unde	stand the concepts of sustainability, sustainable development and linkages between
technology	and sustainability.
CO2: Unde	rstand the concept and different tools & techniques of sustainable manufacturing.
	about different environmental standards and their requirement for sustainable
developme	nt.
	about various eco-friendly product design methods and multi-criteria decision
	sustainability.
	erstand the environmental, economic, societal and business indicators of
sustainabi	
MTME-2	20 Vibration and Noise Control
Course C	
CO1: Und	erstand the multi-degree freedom system and concept of free and forced vibrations
CO2: Unc	erstand the implementation of different numerical methods of multi-degree system.
CO3: Lea	rn about the concepts regarding vibration of strings, bars, shafts and beams.
CO4: Un	derstand the concept of vibration control and measurement, vibration isolation, vibration exciters and vibration
absorber	
	arn about fundamentals of noise measurement and noise control.
MTME-2	221 COMPOSITE MATERIALS
Course	Outcome
CO1: De	scribe the concept, need and applications of composite materials.
CO 2: 5	olve the problem of effects of influencing factors on the strength of composite materials
CO3. De	mostrate the various manufacturing processes of the composites
CO 4:Su	ggest/select optimum combination of Matrix/Reinforcement for various engineering applications.
Design	of Steam Turbines MTME-224
Course	Outcome
CO:1 St	idents will be able to practice the basic concepts and working cycles for steam engines.
CO:2 St	udent will be able to design the blades and impeller for impulse and reaction turbines.
CO:3 St	udent will be able to identify and make different types of condensers, cooling water calculations etc.
MTME-	225 Convective Heat Transfer
Course	Outcome
CO1 · De	evelopment of 3D unsteady (generalized) momentum, energy and mass transfer
equatio	in the Cartesian system, representing them in tensor and vector notations, expandable to other coordinate syst
C02: D	evelopment of generalized Integral form of Momentum and energy equations,
lidentifi	ration of the displacement, momentum, conduction and enthalpy thicknesses,
Icolutio	as for variable free stream velocities over curved surface and for flow over a body of arbitrary shape.
ICO3: /	malysis of momentum and energy boundary layers in pipe flows, identification of
lentrar	ice and fully developed region during laminar flow, solution of energy differential equations for constant heat flux ar

	Concerts Modelling OF External and
	equations for the turbulent flows. CO6: Analyze heat exchanger performance by using the method of heat exchanger effectiveness. CO1: Understand
	Combustion Engineering the performance by using the set of
	Combustion Engineering MTME-226
1	
	CO:2 Learn Combuctisely a difference between premised
	CO: 3 Learn chemilumine the second se
	CO:2 Learn combustion mechanisms of gaseous, liquid and solid fuels MTME-227 Comduction mechanisms of flame and the
	CO: 3 Learn chemiluminescence phenomena of flame and the prevention method of air pollutant MTME-227 Conductive & Radiative Heat Transfer Course Outcome
	CO1: Calculate and in the second seco
	CO1: Calculate emission of thermal radiation from a black body or grey body. CO2: Calculation of view factor between two objects
4.8	CO2: Calculation of view factor between two objects.
THE REAL	radiation interchange between different for the second sec
	CO3: Analyse simple radiation interchange between diffuse surfaces, radiation from a volume to a surface and an object with CO4: Understand the fundamentals of convective heat transfer process.
Ter.	CO5: Analyze heat exchanger parts or convective heat transfer process.
	MIME-229 Design of HVAC Cost Mance by using the method of heat exchanger effectiveness
	CO1: Describe the requirement
	CO1: Describe the requirement specifications for indoor air quality, energy supply and energy use. CO2: Describe system solutions for renewable energy production and heat storage CO3: Describe system solutions for ventilation and the storage
	COS. Describe system colutions (
	CO4: Describe solutions for demonstration and tempering of rooms
	CO5: Describe the components of United Supply, severage and preparation of domestic bot water methods
	CO6: Describe the content of colutions for
	CO6: Describe the content of solutions for monitoring and control of air conditioning plants Design and optimization of Thermal Systems MTME-230 Course Outcome
	Course Outcome
	CO:1 Integrate thermal component models and simulate a thermal
	system
	CO:2 Perform an economic analysis of a thermal system.
	CO:3 Use the computer to solve thermal system models
	CO:4 Communicate thermal system designs both orally and in writing
	CO:5 Apply optimization procedures and design optimized thermal
SC	systems
1.	MTME-301 :Project
	Course Outcome
28	CO1: Identify an engineering problem dovice a means of orly
:16	CO1: Identify an engineering problem, devise a means of solving and exhibit the ability to execute the solution. CO2:Demonstrate knowledge of professional and ethical responsibilities
8	CO3:Formulate and implement innovative ideas for social and environmental benefits.
20-	CO4: Write technical report of the project apart from developing a presentation.
	COS: Demonstrate an ability to the present and defend their and their second their
	CO5: Demonstrate an ability to present and defend their research work to a panel of experts. Paper MTME404 Dissertation
14.	Course Outcome
a reacher and	CO1: Demonstrate a depth of knowledge of Mechanical Engineering.
	CO 2: Complete an independent research project project project project
	CO 2: Complete an independent research project, resulting in at least a thesis publication, and research outputs in terms of publications in high impact factor journals, conference proceedings, and patients
	publications in high impact factor journals, conference proceedings, and patents, CO 3: Demonstrate knowledge of contemporary issues in their chosen field of research.
	to state the wedge of contemporary issues in their chosen field of research



	Course Outcome
O1: Formulate a research problem	
2: Explain the different experimental desig	ans and their analysis.
O 3: Apply different statistical tools for the re	search analysis
O 4: Apply the research ethics	
Ion Conventional Machining (PhD Course	e Work)
Course Outcome	
01: Understand the need of Non Conventiona	al Machining Processes and able to Classify various processes.
O2: Recognize the role of mechanical energy	in non-Conventional machining processes.
CO3: Apply the knowledge on machining electr	rically conductive material through electrical energy in non-Conventional
CO4: Understand the concept of machining the	e hard material using chemical energy and electrochemical energy.
CO5: Apply the knowledge on machining elect machining processes.	rically conductive material through electrical energy in non-Conventional
CO6: Familiarity and application of various the	ermal energy based non-conventional machining processes.
hD Paper Presentation/Seminar	
Course Outcome	
CO1: Deal with nerves and think more positive	ly about public speaking.
10 2: Consider ways of grabbing the listener's	attention, holding their interest, and concluding strongly.
CO3: Use body language and tone of voice to e	enhance their presentations.
CO4: Use slides and visual aids effectively.	
CO5: Deliver an enthusiastic and well-practised	f presentation.
Advanced Heat Transfer	
Course Outcome	
:01: Understand the principles of heat transfe	r through conduction, convection and radiation modes.
O2: Understand the heat transfer during phase	se-change processes, such as boiling and condensation.
:03: Understand the practical aspects of the th	heories of heat transfer, such as design of heat exchangers.
:04: Understand the concept related to mass t	transfer and its connection with heat transfer.
:05: Carry out laboratory tests verifying the va	arious principles of heat transfer.
dvanced Fluid Mechanics and CFD	
Course Outcome	
O1: Understand the concept of computational	fluid dynamics, modeling and simulation.
O2: Learn about the different governing equa	tions of fluid dynamics.
O3: Understand the concept of parabolic, ellip	otic and hyperbolic equations and various
nethods of finite differencing and stability.	
04: Understand the concept of turbulence, er	ror and uncertainty & different turbulent
inite Elements Methods	the second s

O1: To obtain an understanding of 🌑 fundamental theory of the FEA	
CO2: To develop the knowledge of mathematics and engineering in sol ransfer.	lving the problems related to structural and heat
CO3: To identify the application and characteristics of FEA elements su	ch as bars, beams, plane and isoparametric elements
CO4: To understand the application and use of the FE method for heat	transfer problems
CO5: Use the commercial FEA packages like ANSYS and modern CAD/C	CAE tools for solving real life structural problems.
Composite Materials	
Course Outcome	
CO1: Describe the concept, need and applications of composite materia	als.
CO 2: Solve the problem of effects of influencing factors on the streng	th of composite materials
CO3: Demonstrate the various manufacturing processes of the Metal/ c	ceramic/polymer-based composites.
CO 4: Test and characterize the composite and suggest secondary proc	cessing as per application.
Optimization Techniques	
Course Outcome	
CO1: Ability to apply the theory of optimization methods and algorithm optimization problems	s to develop and for solving various types of
CO2: Ability to go in research by applying optimization techniques in pr	oblems of Engineering and Technology
CO3: Ability to solve the mathematical results and numerical technique	
problems by using computer software.	
Computer Aided Design and Manufacturing (CAD/CAM)	
Course Outcome	
CO1: Apply/develop solutions or to do research in the areas of Design a	
CO2: Have abilities and capabilities in developing and applying compute manufacturing fields.	
CO3: Review and document the knowledge developed by scholarly pre- technological issues.	decessors and critically assess the relevant
CO4: Formulate relevant research problems; conduct experimental and modern mathematical/scientific methods and use of software tools.	l/or analytical study and analyzing results with
Advanced Theory of Vibrations	
Course Outcome	
CO1: Recognize the need and measurement of vibration in mechanical	systems
CO2: Suggest suitable methods of vibration reduction and absorption	
CO3: Calculate natural frequencies of vibrations	
CO4: Distinguish between systems with different degrees of vibration	
Tribology	
Course Outcome	
CO1: Be able to know the field of tribology.	
CO2: Be able to know the surface, properties of surface and related ins	struments
CO3: Be able to understand the friction, friction theory and behaviour of	

1ª

Contraction of the second

	CO4: Be able to understand wear processes, wear theory, behaviour of metals and non-tals and different instruments
	Thermo Economics and Power Plants
4	Course Outcome
	CO1: Understand and know the requirements for a Thermal Power Plant and Nuclear Power Plant, from sources to
	consumption and economics of power plants
	CO2: Study and learn the processes and cycles followed in Thermal Power Plants and nuclear power plants and componer used in the power plants.
	CO3: Apply the knowledge gained by analyzing the steam power plants, steam generators and gas turbine power plants, improve the efficiency and reduce the thermal losses.
	CO4: Apply the knowledge in calculating the Power Load Calculations and Distribution.
	Advanced Thermodynamics
	Course Outcome
	CO1: Describe the various laws of thermodynamics and their applications
	CO 2: Explain the concepts of availability and irreversibility with respect to reacting and nonreacting systems.
	CO 3: Describe methods in using equations of potentials, availability, and exercy for thermodynamic analysis.
	CO 4: Explain the behaviour of gases and chemical equilibrium.
	Presentation/Seminar
	Course Outcome
	CO1: Deal with nerves and think more positively about public speaking.
	CO 2: Consider ways of grabbing the listener's attention, holding their interest, and concluding strongly.
	CO3: Use body language and tone of voice to enhance their presentations.
	CO4: Use slides and visual aids effectively.
	Production Engineering
	Course Outcome
	CO1: Understand the various Conventional and Non-Conventional machining processes
	CO2: Learn about measuring equipment, error types and their evaluation
	CO3: Learn about process capability and six sigma
	CO4: Learn about quality control and quality assurance systems
	Advanced Mechanics of Solids
	Course Outcome
	CO1: Understand concepts of stress and strain in solids and associated theories of failure.
	CO2: Derive governing equations to solve engineering problem.
	CO3: Apply analysis techniques to determine stress in components such as shafts, beams, shells and rotating discs under
•	different loading conditions.
	CO4: Analyze deformations in beam and locate shear centre in thin-walled beams.
	Mechatronics
	Course Outcome
	CO1: Each individual should develop competence in technologies of automation.
	CO2: Capable to develop simple control systems and study the system response.
	CO3: Individual should be able to understand the communication system in automation

