UNIVERSITY OF JAMMU

(NAAC ACCREDITED A + GRADE UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION

(23/Sept/Adp/ 78)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B.Tech.) in Mechanical Engineering** for Semester III & IV under the **Credit Based System** as per the new **AICTE** Model Curriculum **(as given in the Annexure)** for the candidates of **Govt./Pvt. Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
Mechanical	**Semester-III**	**December 2023, 2024, 2025 and 2026**
	Semester-IV	**May 2024, 2025, 2026 and 2027**

The Syllabi of the course are available on the University Website: www.jammuuniversity.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/23/10022-10031
Dated: 13/09/2023
Copy for information & necessary action to:-

1. Dean, Faculty of Engineering
2. Principal, GCET/MBSCET/BCET/YCET
3. C.A to the Controller of Examinations
4. Joint/Assistant Registrar (Exams Prof./Eval Prof./Confidential)
5. Incharge University Website

Supriyaa 13/Sept/23
Assistant Registrar (Academic)
13/9 13/9/23

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

B. Tech. Mechanical Engineering 3rd Semester

Contact Hrs.: 27

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
MET5301	Professional Core Course	Fluid Mechanics	2	1	0	50	100	150	3	20%
MET5302	Professional Core Course	Thermodynamics	2	1	0	50	100	150	3	25%
MET5303	Professional Core Course	Machine Drawing	3	0	0	50	100	150	3	20%
MET5304	Professional Core Course	Mechanics of Solids	2	1	0	50	100	150	3	27%
MET5305	Professional Core Course	Production Technology-I	2	1	0	50	100	150	3	20%
MEP5311	Professional Core Course	Fluid Mechanics Lab.	0	0	2	50	0	50	1	15%
MEP5312	Professional Core Course	Thermodynamics Lab.	0	0	2	50	0	50	1	10%
MEP5313	Professional Core Course	Mechanics of Solids Lab.	0	0	2	50	0	50	1	15%
MEP5314	Professional Core Course	Production Technology-I Lab	0	0	2	50	0	50	1	100%
MOC5315	Massive open online course	MOOC	0	0	2	50	0	50	1	100%
NCC7301	Non Credit Course	Essence of Indian Traditional knowledge	2	0	0	Satisfactory/Unsatisfactory			Non Credit	100%
TOTAL			13	4	10	500	500	1000	20	

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023,2024,2025,2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: FLUID MECHANICS
COURSE CODE: MET5301
DURATION OF EXAMINATION: 3 HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior
CO2	Explain the principles of pressure, buoyancy and floatation.
CO3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
CO4	Explain the concept of boundary layer in fluid flow
CO5	Developing understanding regarding the concepts of dimensional analysis and Moody's chart.

Detailed Syllabus

SECTION-A

Basics: Introduction, Fluids and their properties, Fluids-shear stress in a moving fluid-difference between solids and fluids-viscosity - Newtonian and Non-Newtonian fluids - viscosity in liquids and gases - density-surface tension - capillarity.

Fluid Statics: Total pressure and centre of pressure for horizontal plane, vertical plane surface and inclined plane surface submerged in static fluid. Buoyancy, centre of buoyancy, metacentre and metacentric height, its application in shipping, stability of floating bodies.

Fluid Dynamics: Eulerian & lagrangian approaches, classification of fluid flow as steady and unsteady flow, uniform and non-uniform flow, laminar and turbulent flow - pathline, stream line, streak line and stream tube - one-, two- and three-dimensional flow - velocity and acceleration in steady and unsteady flow.

Basic hydrodynamics: Ideal fluids - equation of continuity, stream function. Euler's equation for unsteady flow in three dimensions - one dimensional flow along a stream of velocity, Bernoulli's equation and its applications - pitot and pitot-static tubes - venturi meter, flow nozzles. **[20Hours]**

SECTION–B

Basic equations of Fluid Mechanics: equation of continuity, momentum equation and energy equation for a control volume, adoption of these equation to one dimensional flow - velocity and momentum correlation - application of momentum equation to straight and bent, uniform and reducing conduits, path of trajectory of a free liquid jet.

Steady flow of incompressible fluids in Pipes, Laminar and Turbulent flows, critical Reynold's number - hydraulic radius - general equation for friction, friction in non-circular pipes - Darcy Weisbach equation - development of boundary layer in pipe's flow, smooth and round pipes, Minor losses in pipes

Boundary Layer Theory: Introduction, momentum integral equation, displacement, momentum and energy thickness, separation of boundary layer, Control of flow separation.

Dimensional Analysis: Buckingham Pie theorem, Flow similarity & model studies, friction & brusler drier, Aerodynamic lift, Navier stokes equation, Torriclies theorem.

Moody's Chart: Reynold number, Friction losses, Friction factor and mean wall stress. **[25 Hours]**

RECOMMENDEDBOOKS:

1. Fluid Mechanics — VLStreeter
2. FluidMechanics — Roberson &Crowe
3. Fluid Mechanics — RK Bansal
4. Fluid Mechanics and Hydraulic Machines — Domkundwar & Domkundwar, Dhanpatrai & Co

Notes:

1. There will be 8 questions in all, four from **Section-A** (each of 20 marks) and four from **Section– B** (each of20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rdSEMESTER
COURSE TITLE: THERMODYNAMICS
COURSE CODE: MET5302
DURATION OF EXAMINATION: 3HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Understanding various thermodynamic systems, properties and other related concepts.
CO2	Evaluate changes in thermodynamic properties of substances.
CO3	Learning the basics of first law and second law equations and related theories with numerical.
CO4	Explain and apply various gas power cycles and IC engine.
CO5	To get conversant with Properties of Steam

Detailed Syllabus

SECTION–A

Basic Concepts: Definition of thermodynamics, Thermodynamic System, Properties, Types of processes, thermodynamic equilibrium, Zeroth law of thermodynamics, Thermometric property, Temperature scales, Energy and its interaction, Work, Work done in various processes, Ideal gas and characteristic gas equation, representation of various processes on PV diagram.

First Law of Thermodynamics: Concept of First law of thermodynamics, Limitations of First law of thermodynamics, PMM-1,Heat transfer, Mayor's equation, Free expansion, Control volume energy analysis, Steady Flow Energy Equation and its application to various thermodynamic Systems, Throttling.

Second Law of Thermodynamics: Thermal energy reservoir, Kelvin Plank statement, Clausius statement, PMM-2, equivalence of Kelvin plant & Clausius statements, PMMM-3, Carnot cycle, Third law of thermodynamics.

Energy, entropy & Exergy: Clausius inequality, concept of entropy, concept of entropy generation in Closed and Open systems, high grade and low-grade energy, available and unavailable energy; Second law efficiency, Concept of Exergy.

[25 Hours]

SECTION-B

Gas Power Cycles: Air-standard efficiency, Nomenclature of Piston-Cylinder arrangement w.r.t. swept volume; clearance volume, compression ratio and mean effective pressure; Analysis and philosophy of Air-Standard Cycles i.e. Otto Cycle, Diesel Cycle and Dual Cycle.

Classification of IC Engines: Basic operations Actual P-V diagram of four stroke Otto cycle engine and four stroke diesel cycle engines. Engine performance parameters, Measurements of fuel and air consumption, brake power and in-cylinder pressure.

Properties of Steam: Pure Substance; Gibb's phase rule; steam formation at constant pressure; use of steam tables, Basic Rankine & Brayton cycle .

[20 Hours]

RECOMMENDEDBOOKS:

1. Engineering Thermodynamics — R.K Rajput
2. A Course in Thermodynamics — Joseph Kerstin
3. Thermodynamics: An Engineering Approach — Yunus A Cengel; Michael A Boles
4. Engineering Thermodynamics — P.K.Nag

NOTE:

1. There willbe8questionsin all, four from **Section-A** (each of20marks)and four from **Section–B**(each of20 marks).
2. Students are required to attempt five questions in all, atleast two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.
4. Use of Steam tables, Mollier chart and scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rdSEMESTER
COURSE TITLE: MACHINE DRAWING
COURSE CODE: MET5303
DURATION OF EXAMINATION: 4 HOURS

CREDITS: 3

L	T	P	Marks	
			Theory	Sessional
3	0	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Read, draw and interpret the machine drawings and related parameters.
CO2	Use standards used in machine drawings of machine components and assemblies.
CO3	Visualize and generate different views of a component in the assembly.
CO4	Learn the concept of limits, fits and tolerances in various mating parts.
CO5	Differentiate between different types of coupling, bearing and joints.

Detailed Syllabus

SECTION-A

1. **Assembly Drawings of the following machines:**
   a) **I.C. Engines Parts:** Piston, Connecting Rod.
   b) **Boiler Mountings:** Feed check valve, Steam stop valve and Blow off Cock.
   c) **Bearings:** Pedestal bearing, Pivot bearing and Swivel bearing
   d) **Miscellaneous:** Screw jack& Tail Stock. **[24 Hours]**

SECTION-B

2. **Simple assemblies of the following:**
   Couplings: Muff Coupling, Split muff, Protected and Unprotected Flange Couplings, Universal Coupling. **[7Hours]**
3. **Different types of Joints**: Riveted joints, Threaded fasteners, Knuckle joint, Cotter Joints: Gib and Cotter Joint. **[7 Hours]**
4. **Practice using Computer Aided Drafting (CAD) tools for-** 2D and 3D views of Machine Components and Screw fasteners. **[7 Hours]**

RECOMMENDEDBOOKS:

1. Machine Drawing — P. S. Gill.
2. Machine Drawing — N. D. Bhatt.
3. Machine Drawing — R. B. Gupta.

NOTE:
1. There will be Six questions in all, five from **Section-B** (each of 15 marks) and one Compulsory question of 55 marks from **Section -A.**
2. Students are required to attempt four questions in all, three from Section-B and one compulsory question involving assembly from **Section A.**
3. Use of scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rdSEMESTER
COURSE TITLE: MECHANICS OF SOLIDS
COURSE CODE: MET5304
DURATION OF EXAMINATION: 3HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Understand simple, compound, thermal stresses and strains their relations and strain energy
CO2	Analyse structural members for stresses, strains and deformations.
CO3	Analyse the structural members subjected to bending and shear loads
CO4	Analyse shafts subjected to twisting loads
CO5	Analyse the short columns for stability.
CO6	Understand the mechanics behind the cylinder design.

Detailed Syllabus

SECTION-A.

Simple Stresses and Strain: Introduction, Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to self-weight, Elastic constants and their relationship

Compound Stresses: Introduction, state of stress at a point, General two dimensional stress system, Thermal Stresses Principal stresses and principal planes. Mohr's circle of stresses

Shear Force and Bending Moment in Beams: Introduction to types of beams, supports and loadings. Definition of bending moment and shear force, Sign conventions, relationship between load intensity, bending moment and shear force. Shear force and bending moment diagrams for statically determinate beams subjected to points load, uniformly distributed loads, uniformly varying loads, couple and their combinations.

Bending stress in Beam: Axial & eccentric load, effect of eccentricity, axial stress & bending stress, resulting stress intensities, Theory of simple bending– bending stress distribution – Load carrying capacity – Proportioning of sections – Flitched beams – Shear stress distribution.

Torsion in Circular Shaft: Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion **[23 Hours]**

SECTION-B

Columns and Struts: Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns.

Thin and Thick Cylinders: Introduction. Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution.

Deflection of Beams: Double Integration method – Macaulay's method – Area moment method for computation of slopes and deflections in beams.

Theories of Failure: Introduction, maximum principal stress theory (Rankine's theory), Maximum shearing stress theory (Tresca's theory), Strain energy theory (Beltrami and Haigh), and maximum strain theory (St. Venant's theory). Theories of failure as applicable to ductile and brittle materials, their significance and comparison. **[22Hours]**

RECOMMENDEDBOOKS:

1. Advanced Mechanics of Solids — L.S. Srinath
2. Elements of Strength of Materials — Timoshenko &Young
3. Mechanics of Material — Beer & Johnson
4. Mechanics of Solids — Popov
5. Strength of Materials — R.K Rajput

NOTE:

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section–B (each of20 marks).
2. Students are required to attempt five questions in all, atleast two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rdSEMESTER
COURSE TITLE: PRODUCTION TECHNOLOGY-I
COURSE CODE: MET5305
DURATION OF EXAMINATION: 3HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Describe the casting process and prepare different types of cast products.
CO2	Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, Sand Slinger Moulding machines.
CO3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces
CO4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings
CO5	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes

Detailed Syllabus

SECTION-A

Introduction: Definition, primary and secondary processes, criteria for selection of manufacturing processes.
Molding and Pattern making – Molding materials, Properties of molding sand, Testing of molding sand. Types of moldings and their applications. Types of patterns – Materials used for patterns, pattern allowances and their construction.
Casting: Steps involved in making a casting, Casting defects and their remedies, Basic principles and applications of special casting processes - Centrifugal casting, Die casting and Investment casting.
Gating and Rising System-Principles of Gating, and its design. Design criteria for pouring basin, sprue, runner gate and riser, problems on Gating design.
Methods of melting and types of furnaces - Cupola, electric arc, resistance and induction furnace. **[23 HOURS]**

SECTION-B

Mechanical working processes: Plastic deformation, Strain Hardening hot and cold working, forming processes. Rolling, drawing, deep drawing. extrusion.
Forging - Types of Forging, Smith forging, Drop Forging, Roll forging, Rotary forging and their applications. Various forging defects and their remedies.
Welding- Classification of welding processes, types of welded joints and their characteristics, Gas welding, Different types of flames and uses, Oxy–Acetylene Gas cutting, Power characteristics, submerged arc welding, TIG & MIG welding.
Special welding processes-Resistance welding, Friction welding, Thermit welding Forge welding, Explosive welding; Resistance welding, Soldering and Brazing, Weld ability of metals, welding defects – causes and remedies.
Sheet Metal processes- Principles and Applications of Blanking, Piercing, Embossing, Coining and Spinning. **[22 HOURS]**

RECOMMENDED BOOKS

1. A textbook of Production Technology Vol. I and II — Sharma, P.C.
2. Manufacturing Technology Vol. I & II — P.N. Rao, Tata McGraw Hill Pub. Co. Ltd., New Delhi
3. Production Technology — HMT
4. Manufacturing Engineering and Technology — Kalpakjian, Addision Wesley Congmen Pvt. Ltd.
5. Workshop Technology Vol. I and II — Chapman W. A. J. Arnold Publisher New Delhi

NOTE:
1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section–B (each of 20 marks).
2. Students are required to attempt five questions in all, atleast two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSETITLE: FLUID MECHANICS LAB
COURSE CODE: MEP5311

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	To calculate fluid properties and characteristics of flow using mathematical knowledge.
CO2	To calculate the coefficient of discharge using different various flow measuring devices.
CO3	To study the impact of momentum variation on vanes and blades
CO4	To predict performance characteristics of turbines

LISTOF EXPERIMENTS:

1. To find out the Metacentric Height of the floating pontoon.
2. To verify the Bernoulli's Equation.
3. To find out the co-efficient of discharge using Venturi meter.
4. To find out the co-efficient of discharge using Orifice meter.
5. To find out the co-efficient of discharge using Pitot tube.
6. Impact of jet of water on Vane.
7. To analyse the regimes of flow using Reynold's Experiment.
8. To find out the viscosity of a fluid using Redwood Viscometer.
9. To find out the Friction factor of a pipe and compare the resistances to flow in various pipes

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: THERMODYNAMICS LAB
COURSE CODE: MEP5312

CREDITS:1

L	T	P	Marks Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Understanding of basic thermodynamics laws and their applications
CO2	Knowledge of different types of boilers, their features and applications
CO3	To gain knowledge about classification and working principle of various types of air compressors.
CO4	To calculate coefficient of performance of refrigerators and air conditioning devices
CO5	Understating of basic cycles on which heat engines works and computing their efficiencies

LISTOF EXPERIMENTS:

1. To verify Second law of thermodynamics with the help of heat engine.
2. To study the P-V-T behavior of real gases in comparison with Ideal gases.
3. To find out the dryness fraction of steam using Throttling Calorimeter.
4. To study the efficiency of Petrol engine.
5. To study the efficiency of Diesel engine.
6. Comparative study of ideal and actual otto cycle
7. Comparative study of Ideal and actual Diesel Cycle
8. Comparative study of Ideal and Real Gases.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 3RD SEMESTER
COURSETITLE: MECHANICS OF SOLIDS LAB.
COURSE CODE: MEP5313

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Evaluate the values of yield stress, breaking stress and ultimate stress of the given specimen.
CO2	To measure the hardness of the given specimen using different hardness testing machines.
CO3	To conduct the bending test to determine the modulus of elasticity of given specimen.

LISTOF EXPERIMENTS:

1. To conduct the tensile test on a M.S. specimen and draw the load extension diagram using a UTM.
2. To conduct the compression test on a concrete specimen and draw the load compression diagram using a UTM.
3. To conduct torsion test on mild steel or cast iron specimen to determine modulus of rigidity.
4. To find the hardness of a specimen using Rockwell Hardness Tester.
5. To find the hardness of a specimen using Brinell Hardness Tester.
6. To find the hardness of a specimen using Vickers Hardness Tester.
7. To conduct the Izod and Charpy Tests on a notched M.S. specimen.
8. To conduct simple bending experiments for different types of loading.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 3RD SEMESTER
COURSE TITLE: PRODUCTION TECHNOLOGY-I LAB
COURSE CODE: MEP5314

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Understanding different manufacturing techniques and their relative advantages/disadvantages with respect to different applications
CO2	To attain practical exposure to different fabrication techniques.
CO3	Creation of simple components using different fabrication techniques.
CO4	Exposure to some of the advanced and latest manufacturing techniques being employed in the industry.

LISTOF EXPERIMENTS:

1. Moulding and Casting of Single Piece Pattern.
2. Moulding and Casting of Split Pattern.
3. To Prepare a cubical block from cylindrical block (MS –round).
4. To make L-shaped hook of Square cross section from MS-round.
5. To make Chisel from MS-round using forging operations.
6. AC arc welding for making corner joint from MS-flat.
7. Single V-Butt joint by using TIG Welding.
8. To make Lap Joint from MS-Sheet using Gas Welding.
9. To make Lap joint using MIG Welding.
10. To make T-joint using AC arc welding.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rdSEMESTER
COURSE TITLE: MOOC
COURSE CODE: MOC5315
DURATION OF EXAMINATION: 3 HOURS

L	T	P	Marks
			Internal
0	0	2	50

MooC: A massive open online course (MooC) is a model for delivering learning content to any person who wants to take a course by means of the web. It has been incorporated in the 3rd semester.
The following scheme shall be used to evaluate a MooC course:

Breakup of Marks:

- **Attendance- 10 marks**
  Students will have to visit the lab/Computer Centre as per the time table and pursue their respective online course.
- **Report file-15 marks**
  A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester. It should contain details about the course that was undertaken by the student. A copy of the assignments with solutions that have been uploaded on the MooC platform should also be included in the final report. A copy of the certificate if awarded should also be appended to the report.
- **Presentation- 15 marks.**
  The presentation should be given to the peers/students focusing on the key points of the course with an aim to share the knowledge.
- **Certification- 10 marks**
  The students awarded with the certificate will be given 10 marks. (Copy to be attached in the report)

Note:
The students can opt for MooC as per their choice. However, the selected course should not be similar to the regular courses offered as a part of the department curriculum. Also, students have to get approval from the department regarding the opted course.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
COURSE CODE: NCC7301
DURATION OF EXAMINATION: 3 HOURS

CREDITS: 0

L	T	P	Marks	
			External	Internal
2	0	0	Satisfactory/Unsatisfactory	

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Know about the Vedic philosophy in detail and its relevance in present scenario.
CO2	Strengthen their mind and body through the knowledge of yoga.

Detailed Syllabus

SECTION - A

Vedic Philosophy: Concept of Vedas, Ethics & Values, Educational system, Knowledge of science, trade/commerce & medicines as per Vedas, Environmental ethics: Preservation & Purification, Harnessing of natural resources in alienation with nature as per Vedas.

[10 Hours]

SECTION – B

Yoga Philosophy: Parts of Yoga, Importance of Yam and Niyam, Stress management through yoga, Purification of mind and body through yoga.

[10 Hours]

Note for Teacher

The course should aim at enlightening students with the importance of ancient traditional knowledge.

Evaluation of the course

There will be internal evaluation based on two internal sessional and viva -voce.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year May 2024, 2025, 2026, 2027

B. Tech. Mechanical Engineering 4th Semester **Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
BST8402	Basic Science Course	Probability & Numerical Methods	2	1	0	50	100	150	3	100%
MET5401	Professional Core Course	Heat Transfer	2	1	0	50	100	150	3	20%
MET5402	Professional Core Course	Theory of M/c	2	1	0	50	100	150	3	20%
MET5403	Professional Core Course	Applied Thermodynamics	2	1	0	50	100	150	3	100%
MET5404	Professional Core Course	Production Technology-II	2	1	0	50	100	150	3	100%
MOC5401	Massive Open Online Course	NPTEL/ SWAYAM	3	-	-	100	-	100	3	100%
MEP5411	Professional Core Course	Heat Transfer Lab	0	0	2	50	-	50	1	15%
MEP5412	Professional Core Course	Theory of M/c Lab	0	0	2	50	-	50	1	15%
MEP5413	Professional Core Course	Applied Thermodynamics Lab	0	0	2	50	-	50	1	100%
MEP5414	Professional Core Course	Production Tech.-II Lab	0	0	2	50	-	50	1	100%
TOTAL			13	5	8	550	500	1050	22	

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING
CLASS: 4th SEMESTER
COURSE TITLE: PROBABILITY & NUMERICAL METHODS
COURSE CODE: BST8402
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Understand the concept of random variables.
CO2	To learn about the different distributions and their properties.
CO3	Learn the basics of operators, their types and interpolation.
CO4	Find out the real roots of algebraic, transcendental equations and differential equations

Detailed Syllabus

SECTION-A

PROBABILITY

Random variable and its types, probability mass function and probability density function, distribution function, Bernoulli distribution, Expectation and moment generating function of Discrete Random variables. Binomial distribution, its mean, variance and moment generating function, mode of Binomial Distribution, Poisson distribution, its mean, variance and moment generating function, Poisson distribution as a limiting case of Binomial distribution. **(22 hours)**

SECTION-B

NUMERICAL METHODS

Finite and divided difference, Interpolation using Newton's and Lagrange's formulae. Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule. Solution of polynomial and transcendental equations – Newton-Raphson method, Iteration method and Regula-Falsi method.

Taylor's method, Picard's method, Euler and modified Euler's methods. Runge Kutta method of fourth order for solving first and second order equations. **(23 hours)**

Text/References:

1. Dr. Bhopinder Singh,''A textbook on complex variables and Numerical methods, Kirti Publishers.
2. N.P. Bali and M. Goyal, "A textbook of Engineering Mathematics,LaxmiPublications,2008.
3. B.S. Grewal, "Higher Engineering Mathematics", Hanna Publishers, 2010.
4. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

NOTE:

1. There willbe8questionsin all, four from **Section-A** (each of 20 marks) and four from **Section– B** (each of20 marks).
2. Students are required to attempt five questions in all, atleast two questions from each section.
3. Use of Calculator is allowed.

R. Kumar

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: HEAT TRANSFER
COURSE NO: MET5401
DURATION OF EXAMINATION: 3 HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	To teach students the basic principles of conduction, radiation, and convection heat transfer. Students will demonstrate an understanding of the basic concepts of conduction, radiation, and convection heat transfer
CO2	To extend the basic principle of conservation of energy to systems that involve conduction, radiation, and heat transfer. Students will demonstrate an understanding of the concept of conservation of energy and its application to problems involving conduction, radiation, and/or convection heat transfer
CO3	To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will demonstrate the ability to formulate practical conduction heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution technique, and evaluating the significance of results.
CO4	To train students to identify, formulate, and solve engineering problems involving radiation heat transfer among black surfaces and among diffuse gray surfaces.
CO5	To train students to identify, formulate, and solve engineering problems involving forced convection heat transfer, natural convection heat transfer, and heat exchangers. Students will also demonstrate an ability to analyze the performance of heat exchangers

Detailed Syllabus

SECTION-A

Introduction: Modes and mechanisms of heat transfer, Basic laws of heat transfer, General discussion about applications of heat transfer.
Conduction: General heat conduction equation in Cartesian and Cylindrical co-ordinates, One Dimensional Steady State Conduction Heat Transfer Homogeneous slabs, hollow cylinders and spheres, Composite systems, Critical insulation thickness, Transient Heat transfer and its Numerical analysis by using Heisler Chart, Extended surface heat transfer in case of long fin, fin with insulated tip and short fin.
Radiation: Radiation spectrum, Thermal radiation, Concept of black body, Monochromatic emissive power, Absorptivity, Reflectivity, Transmissivity, Emissivity, Plank's Law, Stephan Boltzmann's Law, Lambert's Law, Kirchhoff's law, Radiation between two real surfaces.
Heat transfer & Fluid flow applications: Thermal insulations, heat transfer controlling air conditioning of electric vehicle. **[24 Hours]**

SECTION–B

Heat exchangers: Types of heat exchangers, Numerical on parallel and counter flow heat exchangers, Log mean temperature difference, Overall heat transfer coefficient, Fouling and scaling of heat exchangers, N.T.U. method of evaluation of heat exchangers. Heat exchanger effectiveness
Convection: Free and forced convection processes, Newton's Law of cooling and its numerical, Significance of Prandtl number, Boundary layer equations, Flat plate heat transfer solutions by integral method, Laminar and Turbulent flow of heat transfer in tubes, Concepts of hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer in case of flat plates and cylinders, Geometrical factors for simple configuration, Radiation shields and its effect on radiative heat flux.
Heat Transfer with Phase Change: Boiling process, types and its different regimes, Calculations on Nucleate boiling, Critical Heat flux and Film boiling. Condensation and Boiling, Film and Drop wise condensation **[21 Hours]**

RECOMMENDED BOOKS:

1. Heat Transfer — J.P. Holman
2. Heat Transfer — Frank Krieth
3. Engineering Heat Transfer — Gupta and Prakash.
4. Fundamentals of Heat Transfer — Frank P.David P.Dewitt
5. Heat Transfer — B. Gebhart

NOTE:

1. There will be 8 questions in all, four from **Section-A** (each of 20 marks) and four from **Section– B** (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of Heat Transfer datebook and a scientific calculator will be allowed in the examination hall.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING
CLASS: 4thSEMESTER
COURSE TITLE: THEORY OF MACHINES
COURSE CODE: MET5402
DURATION OF EXAMINATION: 3 HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Be familiar with common machine elements and analysis of different mechanisms used in various types of machines.
CO2	Be familiar with concepts of gears, cams, governors. Be aware of common machine elements & to solve problems related To motion transmission.
CO3	Dynamically analyze common mechanisms.
CO4	Conceptualize gyroscopic effect &mathematically solve problems of flywheel.
CO5	Conceptualize static and dynamic balancing of rotating and reciprocating engines &identify various types of mechanical vibrations, their causes and solutions.

Detailed Syllabus

SECTION-A

General concepts, Velocity and Acceleration Analysis: Introduction of Simple mechanism, Different types of Kinematics pair, Kutzbach Equation, Grublers Criterion, Grashof's Law, inversions of four bar chain, slider crank chain and double slider crank chain, quick return motion mechanism, Velocity of point in mechanism, relative velocity method, Velocities in four bar mechanism, Instantaneous center method, Acceleration analysis.
Gears & Gear trains: Gear terminology, types of gears, Involute and Cycloid, comparison of characteristics of Involute & cycloid profile, interference, Introduction to gear trains, simple gear trains, Compound gear train, Epicyclical gear train.
Cams: Classification of cams and followers, Terminology, geometry of radial cam, displacement diagram, uniform velocity, simple harmonic, uniform acceleration, cycloid, graphical layout of cam profiles with different followers, follower velocity.
Governors: Function, types of governors. Watt, Porter and Proell governors, Sensitivity, stability, isochronism's and hunting of governors, Governor Effort and power, effect of sleeve friction.

[20Hours]

SECTION–B

Kinematics & Dynamics of reciprocating Engines: Kinematic analysis of reciprocating engine, Inertia forces, Dynamic analysis of reciprocating engine, Equivalent masses for different members.
Turning Moment Diagrams &Flywheels: Turning moment diagrams for reciprocating machines, Fluctuation of Energy, Determination of Maximum Fluctuation of Energy, Coefficient of Fluctuation of Energy, Flywheel, Fluctuations of speed, coefficient of fluctuation of speed, Energy Stored in a Flywheel.
Gyroscope: Gyroscope, Gyroscopic couple, gyroscopic stabilization, Gyroscopic Effects on Aeroplanes and ship, stability of an automobile.
Balancing: Static and Dynamic balancing, balancing of several masses in a plane, balancing of masses rotating in different planes.

[25 Hours]

RECOMMENDED BOOKS:

1.	Kinematic Analysis of Mechanisms	JE Shigley
2.	Kinematics &Dynamics of Machines	George Hmartin
3.	Mechanics of Machinery	CW Ham, EJ Craw & WL Rogers
4.	Theory of Machines	SS Rattan
5.	Elementary Kinematics of Mechanisms	Zimmerman
6.	Theory of Machines	RS Khurmi
7.	The Theory of Machines	Malhotra & Gupta.
8.	Mechanical Vibrations	G.K.Grover

NOTE:
1. There will be 8 questions in all, four from **Section-A** (each of 20 marks) and four from **Section–B** (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING **CREDITS: 3**

CLASS: 4th SEMESTER

COURSE TITLE: APPLIED THERMODYNAMICS

COURSE CODE: MET5403

DURATION OF EXAMINATION: 3 HOURS.

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Define various concepts of thermodynamics and design a thermal system that meets desired specifications and requirements.
CO2	Apply concepts of thermodynamics for evaluating the properties of fluids used in various industrial systems such as Mechanical Power Production by using engines, air conditioning and refrigeration
CO3	Identify, formulate and solve thermal engineering problems and demonstrate and conduct experiments, interpret and analyze data and report results.
CO4	Understand the working principle of Boilers, Steam turbines and their applications
CO5	Understand the working principle of Steam nozzles, compressors and their applications.

Detailed Syllabus

SECTION-A

Thermodynamics of Combustion in Boilers and IC Engines: Principle of Combustion; Stoichio-metric and non-stoichiometeric combustion; Combustion Problems in boilers & IC Engines; Calculations of air fuel ratio: Analysis of products of combustion, conversion of volumetric analysis into gravimetric analysis and vice versa, Actual weight of air supplied, Heat of formation; Enthalpy of formation, Various stages of combustion in IC Engines.

Steam generators: Classification, Modern steam generators, boiler mounting and accessories, Boiler performance. Boiler draught and chimneys calculations.

Steam Nozzles: Definition, types and utility of nozzles, Flow of steam through nozzles, Condition for maximum discharge through nozzle, Critical pressure ratio, its significance and its effect on discharge, Areas of throat and at exit for maximum discharge, Effect of friction, Nozzle efficiency, Convergent and Convergent-divergent nozzles. Calculation of Nozzle dimensions (length and diameters of throat and exit), Supersaturated (or metastable) flow through nozzle. **[22 Hours]**

SECTION-B

Steam Condensers: Elements of condensing unit; Types of condensers, Dalton's law of partial pressures applied to the condenser problems, Condenser and vacuum efficiencies, cooling water calculations, Effect of air leakage, Method to check and prevent air infiltration, Description of air pump and calculation of its capacity, Cooling towers: function, types and their operation.

Vapour Power Cycle: Carnot Cycle and its limitations; Rankine steam power cycle, Ideal and actual; Mean temperature of heat addition; Effect of pressure, temperature and vacuum on Rankine Efficiency; Rankine Cycle Efficiency and methods of improving Rankine efficiency: Reheat cycle, Bleeding(feed-water-heating), Regenerative Cycle, combined reheat-regenerative cycle; Ideal working fluid, Binary vapour cycle, Combined power and heating cycles.

Centrifugal Compressor: Principle, components, complete thermodynamics analysis, isentropic and Isothermal efficiencies, work done and pressure rise, Velocity vector diagrams for centrifugal compressors and power calculation, pre-guide vanes and pre-whirl, slip factor, power input factor, degree of reaction and its derivation, energy transfer in backward, forward and radial vanes. **[23 Hours]**

RECOMMENDED BOOKS:

1. Thermodynamics — Rogers& Mayhew
2. Applications of Thermodynamics — V. Kadambi, T. R. Seetharam, K. B. Subramanya Kumar
3. Thermodynamics — Yunus A, Cengel, Michael A Boles
4. Applied Thermodynamics — Mathur &Mehta
5. Thermal Engineering — R.K Rajput
6. Thermodynamics — Gupta & Prakash

NOTE

1. There will be 8 questions in all, four from **Section-A** (each of 20 marks) and four from **Section–B** (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING
CLASS: 4th SEMESTER
COURSE TITLE: PRODUCTION TECHNOLGY-II
COURSE CODE: MET5404
DURATION OF EXAMINATION: 3HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Explain the construction & specification of various machine tools.
CO2	Discuss features and applications of reciprocating machine tool like shaper, planer and slotting machine and understand concept of boring and drilling, their difference and grinding of materials.
CO3	Understand construction and working of semiautomatic and fully automatic lathe machine and write a program to control and operate NC and CNC machine. Apply mechanics of machining process to evaluate machining time

Detailed Syllabus

SECTION–A

Introduction to Metal cutting: Orthogonal and oblique cutting. Classification of cutting tools: single, and multipoint; tool signature for single point cutting tool. Mechanics of orthogonal cutting; chip formation, shear angle and its significance, Merchant circle diagram. determination of cutting forces using merchant analysis, Numerical problems, Cutting tool materials and applications, economics.

Introduction to basic metal cutting machine tools: Lathe- Parts of lathe machine, accessories of lathe machine, and various operations carried out on lathe, Turret and Capstan lathe.

Milling: Various Milling operations, classification of milling machines, Vertical & Horizontal milling, up milling & down milling. Indexing: need of indexing, simple, compound & differential indexing.

[22 Hours]

SECTION –B

Drilling: Various drilling operations, types of drills, geometry of twist drill, difference between drilling, boring and reaming, boringoperations & boring machines, MRR and drilling time.

Shaping, Planning and Slotting machines-machining operations and operating parameters.

Grinding: Grinding Operations, classification of grinding processes: cylindrical, surface & centerless grinding, wheel life and grinding ratio

Semi-automatic lathes: capstan and turret lathe, constructional features, tool layout, indexing of turret, work and tool holding devices, machining operations.

Automatic Lathes: Features of construction and operation of single spindle automatic screw cutting machine, Swiss type screw cutting machine.

Non-Conventional machining: Overview of NCM, Ultra sonic machining, electrical discharge machining, abrasive jet machining, water jet machining.

[23 Hours]

RECOMMENDED BOOKS:

1. A textbook of Production Technology Vol.I and II — Sharma, P.C.
2. Manufacturing Technology Vol. I & II — P.N.Rao, Tata McGraw Hill Pub. Co. Ltd., New Delhi
3. Production Technology — HMT
4. Manufacturing Engineering and Technology — Kalpakjian, Addision Wesley Congmen Pvt. Ltd.
5. Workshop Technology Vol. I and II — Chapman W. A. J. Arnold Publisher New Delhi

NOTE:

1. There will be 8 questions in all, four from Section-A(each of 20 marks)and four from Section-B.
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of scientific calculator will be allowed in the examination hall.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: HEAT TRANSFER LAB
COURSE NO: MEP5411

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	To determine and analyse heat transfer rates and its characteristics in composite systems and extended surfaces
CO2	To calculate and analyse the temperature distribution, heat transfer coefficient in case of free and forced convection.
CO3	To calculate the effectiveness of parallel and counter flow heat exchanger under different flow conditions.
CO4	To determine and analyze radiation heat transfer between surfaces and its various parameters.

LISTOF EXPERIMENTS:

1. To find the thermal conductivity of a given insulating material.
2. To analyse heat transfer characteristics of horizontal cylindrical fins.
3. To analyse natural heat transfer from a vertical pipe.
4. To study the working of a natural convection solar water heater.
5. To analyse the temperature distribution, heat transfer coefficient and efficiency of a pin fin in natural and forced convection heat transfer.
6. To calculate overall heat transfer coefficient for both parallel/counter flow arrangement type of heat exchanger during the operation of heat transfer form air to air, air to water, water to water.
7. To determine the value of Stefan-Boltzmann constant radiation heat transfer.
8. To find out the heat transfer characteristics of cooling tower.
9. To find out heat transfer characteristics in natural convection.

NOTE:

1. At least six practical's should be performed.
2. Additional labs/experiment can be performed based on course content requirements.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: THEORY OF MACHINES LAB
COURSE CODE: MEP5412

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	To understand the kinematics of Quick Return Motion mechanisms
CO2	To understand the basics of balancing of different masses
CO3	To get knowledge about working principles of various types of gear trains, cam and governors
CO4	To have knowledge of construction and working of gear box and braking system

LISTOF EXPERIMENTS:

1. To study the various types of gearboxes.
2. To find out displacement, velocity and acceleration of slider of the Quick-return motion mechanism.
3. To analyse various types of gear trains.
4. To analyse various types of cams and followers.
5. To analyse various types of Governors with the help of stroboscope and to determine sleeve displacement, speed of Governor and Corresponding radius of Governor in case of
   (i). Watt Governor (ii). Porter Governor (iii) Proell Governor
6. To analyse static and dynamic balancing apparatus.
7. To analyse the torsional vibration (undamped) of single rotor shaft system.
8. To study the phenomenon of whirling of shafts.
9. To study & analyse the various types of brake systems.

NOTE:

1. At least six practicals should be performed.
2. Additional labs/experiment can be performed based on course content requirements.
3. Simulation/virtual labs can used to enhance the practical ability of students.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSETITLE: APPLIED THERMODYNAMICS LAB.
COURSENO: MEP5413

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Explain different boilers and can draw heat balance sheet of the boiler and also were in the position to explain the combustion product of the boiler and also tell about the methods to control harmful product.
CO2	Explain about steam turbine and steam nozzle actual work and the type of losses occur in them with different plots.
CO3	Understand practical work of power plant and communicate with each other more frequently regarding various thermodynamics equipment in industry.

LIST OF EXPERIMENTS:

1. To Study various types of boilers.
2. To study Heat balance in boilers.
3. To find volumetric and isothermal efficiency of reciprocating air compressor.
4. To study Combustion analysis by Orsat Apparatus.
5. To study characteristics of Steam Nozzles.
6. Study the performance parameters of Steam turbine.
7. To study A/F ratio variation with load.
8. To determine Calorific Value of fuel using Bomb Calorimeter.

NOTE:

1. At least six practical's should be performed.
2. Additional labs/experiment can be performed based on course content requirements.
3. Simulation/virtual labs can used to enhance the practical ability of students

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: PRODUCTION TECHNOLOGY-II Lab
COURSENO: MEP5414

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	To have practical knowledge about various operations which are performed on lathe machine
CO2	To Perform thread cutting operation as per the diagrams and compare with standard thread gauges.
CO3	To fabricate small parts using Capstan and Turret machines
CO4	To Perform grinding operation up to required dimensions using grinding machines
CO5	To have practical knowledge of various drilling operation performed by drilling machines.

LISTOF EXPERIMENTS:

1. To perform simple turning on lathe machine.
2. To perform step turning using lathe machine.
3. To perform taper turning using lathe machine.
4. To perform threading and knurling operation using lathe machine.
5. To make Chuck Key with hand using Lathe machine.
6. To perform Boring operation on MS-Round using lathe machine.
7. To make bush using Capstan and Turret Lathe.
8. To drill holes of different diameter on MS-flat using different size drills on drilling machine.
9. To cut gear teeth on milling machine using dividing head.
10. To perform grinding operation on surface grinder.

NOTE:

1. Atleast six practical's should be performed.
2. Additional labs/experiment can be performed based on course content requirements.

B. Tech. Mechanical Engineering 4th Semester Examination to be held in the Year MAY 2024, 2025, 2026, 2027

CREDITS: 3

BRANCH: MECHANICAL ENGINEERING
CLASS: 4th SEMESTER
COURSE TITLE: NPTEL/ SWAYAM
COURSE CODE: MOC-5401
DURATION OF EXAMINATION: 3 HOURS

L	T	P	Marks
			Internal
3	0	0	100

The department shall offer the SWAYAM/ NPTEL course (12 weeks) out of the list of courses offered by the SWAYAM around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the teacher incharge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note: In case the student does not pass the certification, exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.