

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: ESME-101

Subject Name: Engineering Mechanics

Programme: B.Tech.(ME)	L: 3 T: 0 P: 0
Semester: 3	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 70%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the meaning of Engineering Mechanics.
2	Solve the problem related to the behaviour of a rigid body due to an external load.
3	Solve, analyze and design moment of area of plane figures.
4	Analyze the mass moment of solid objects.
5	Apply the Work-Energy Equation and Impulse-Momentum equation.
6	Analysis and Solve friction related problems.

Subject Code: PCME-101

Subject Name: Thermodynamics

Programme: B.Tech.(ME)	L: 3 T: 0 P: 0
Semester: 3	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 70%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand and use basic concepts and First Law of Thermodynamics for engineering applications.
2	Apply the Second law of Thermodynamics and related properties for the feasibility of engineering systems and solve engineering problems.
3	Recognize the nature of substance from the understanding of its properties and use related Tables and Charts.
4	Evaluate and analyze the performance of Air Standard and Vapor power cycles.
5	Apply combustion equations to analyze the products of combustion and combustion phenomenon.
6	Select IC Engine for a particular application.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-102

Subject Name: Strength of Materials

Programme: B.Tech. (ME)	L: 3 T: 1 P: 0
Semester: 4	Teaching Hours: 39
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 70%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Formulate mechanics problems using calculus and differential equations.
2	Solve, analyze and design beams under bending stresses.
3	Understand the design considerations of structures subjected to different/wide range of loading conditions including thermal loads.
4	Relate the design problems with practical applications.
5	Solve problem involving simple and combined modes, including torsion.
6	Evaluate slope and deflection in different type of beams under different loading conditions.

Subject Code: PCME-103

Subject Name: Manufacturing Processes

Programme: B.Tech.(ME)	L: 3 T: 0 P: 0
Semester: 4	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Use the Knowledge of Fundamental principles of Castings, Welding, forming and cutting processes for their practical applications.
2	Identify and suggest equipment, tools and accessories required for performing the various manufacturing processes.
3	Know about cutting tools and their materials and related concepts like tool life, wear, and coolants/lubricants.
4	Identify various machine tools and knowledge of different parameters of the processes for analyzing their effect.
5	Suggest a suitable process for manufacturing of component.
6	Understand the latest technologies in Manufacturing Processes.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-104 Subject Name: Machine Drawing and Computer Aided Design

Programme: B.Tech.(ME)	L: 1 T: 0 P:4
Semester: 4	Teaching Hours: 60
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 90%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	To acquire the knowledge of CAD software and its features.
2	To inculcate an understanding of the detail/assembly drawings using orthographic projections and sectional views.
3	To familiarize the students with Indian Standards on drawing practices.
4	To impart knowledge of thread forms, fasteners, keys, joints and couplings.
5	To make the students interpret drawings of machine components so as to prepare assembly drawings either manually and using CAD packages.
6	To acquire the knowledge of limits fits and tolerance pertaining to machine drawings.

Subject Code: PCME 105 Subject Name: Engineering Materials and Metallurgy

Programme: B.Tech.(ME)	L: 3 T: 0 P: 0
Semester: 3	Teaching Hours: 38
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Ability to differentiate ferrous and non-ferrous metals.
2	Explain the significance of the metallurgical characteristics of engineering materials (both ferrous and non-ferrous).
3	Explain the theories of diffusion, plastic deformation and re-crystallization.
4	Analyze various heat treatment processes and their applications for ferrous materials.
5	Explain the role of Fe-C and TTT diagram for controlling the desired structure and properties of the materials.
6	Suggest the methods to determine the harden-ability of materials.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: LPCME-101

Subject Name: Strength of Materials Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 3	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE):2hr
Total Marks: 50	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Conduct mechanical testing (Tensile, compression, Impact, bending, torsion of various materials).
2	Compare mechanical properties of various materials.
3	Analyse buckling load of long columns.
4	Understand load –deflection relation of helical spring.
5	Conduct fatigue testing of the materials.
6	Conduct hardness test on various materials.

Subject Code: LPCME-102

Subject Name: Engineering Materials and Metallurgy

Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P:2
Semester: 3	Teaching Hours: 20
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 1 hr
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Identify various Crystal structures of different samples.
2	Compare various micro structures from standard specimens and compare with standard specimen.
3	Create/Prepare specimens of mild steel for study of microstructure.
4	Perform various Heat Treatment Processes practically on Specimens.
5	Determine the effect of various Quenching media on properties of steel.
6	Use different methods to determine Hardenability of steel specimens.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: LPCME-103

Subject Name: Manufacturing Processes Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P:2
Semester: 3	Teaching Hours: 20
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 1 hr
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Conduct various tests on molding sand
2	Determine major characteristics of molding sand.
3	Use the equipments like TIG MIG, welding and study the effect of various process parameters on weld quality.
4	Learn about grinding practice of single and multipoint cutting tools for efficient use of grinding equipment.
5	Use conventional cutting machine tools like milling for given jobs /work pieces.
6	Determine cutting forces with the use of tool dynamometer.

Subject Code: PCME-106

Subject Name: Theory of Machines

Programme: B.Tech.(ME)	L: 3 T: 1 P: 0
Semester: 4	Teaching Hours: 40
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 70%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understanding the basic concept of kinematics and kinetics of machine elements.
2	Evaluate forces and couples applied to the machine elements.
3	Understand the function and application of gears and Evaluate the velocity ratio and torque in different gear trains.
4	Creating and designing of different types of cams.
5	Applying the concept of Static and dynamic balancing of rotating and reciprocating masses.
6	Understand the function of belt drives, brakes and clutches.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-107

Subject Name: Applied Thermodynamics

Programme: B.Tech.(ME)	L: 3 T: 1 P: 0
Semester: 4	Teaching Hours: 39
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 50%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand various types of steam turbines and analyze various performance parameters.
2	Estimate the amount of cooling water required in a specific type of condenser.
3	Understand working principles and performance parameters of reciprocating and rotary compressors.
4	Understand working principles and performance parameters of Centrifugal and axialflow compressors.
5	Conduct thermal analysis of various types of gas turbines and their performance investigation.
6	Understand various types of jet propulsion systems and common propellants.

Subject Code:BSME-101

Subject Name: Mathematics III

Programme:B.Tech. (ME)	L: 3 T: 1 P: 0
Semester:4	Teaching Hours: 40
Theory/Practical: Theory	Credits:4
Internal Marks:40	Percentage of Numerical/Design/Programming Problems:90%
External Marks:60	Duration of End Semester Exam (ESE): 3hr
Total Marks:100	Course Status: Compulsory

On completion of the course, student will have the ability to:

CO#	Course Outcome (CO)
1.	Understand Partial Differential Equations and their solutions techniques.
2.	Infer the solution of several engineering problems involving one dimensional wave and heat equation , Laplace equation
3.	Evaluate the derivative and integration of functions of complex variable.
4.	Analyze probability spaces, random variables and bivariate distributions.
5.	Formulate and solve problems involving random variables.
6.	Apply statistical methods for analyzing experimental data.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-108

Subject Name: Fluid Mechanics and Machinery

Programme: B.Tech.(ME)	L: 3 T: 1 P: 0
Semester: 4	Teaching Hours: 40
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 50%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the structure and properties of the fluid.
2	Understand the concept and solve problems related to statics, kinematics and dynamics of fluids.
3	Use and apply dimensional analysis techniques to various physical fluid phenomena.
4	Analyze the viscous flow through pipe flow and determine head loss in pipe network.
5	Recognize basic components of turbo machines and understand related fundamental laws/ principles and apply these for calculation of various parameters like work done, force efficiency etc.
6	Understand constructional details, working and design aspects of runner/wheel and evaluate the performance of various turbines like Pelton, Francis, Kaplan, Centrifugal and Reciprocating pump.

Subject Code: PCME-109

Subject Name: Modern Manufacturing Processes

Programme: B.Tech.(ME)	L: 3 T: 0 P: 0
Semester: 4	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the concept of latest technologies and Non Traditional machining processes needed for manufacturing of components.
2	Select suitable technology or process for stringent requirement of manufacturing industry.
3	Describe and demonstrate the constructional features of machines/set ups related to major nonconventional machining.
4	Analyze the effect of process parameters on performance of major non-conventional machining.
5	Understand the concepts related to hybridization of modern machining processes and their utilization in industry.
6	Use various additive manufacturing processes according to industrial requirements.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: LPCME-104

Subject Name: Theory of Machines Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 4	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 2hr
Total Marks: 50	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Conceptualize the function and applications of kinematic chains, mechanisms.
2	Calculate coefficient of friction for different types of belt-pulleys and material combinations.
3	Understand the function of gears and evaluate gear train value of different gear trains.
4	Determine magnitude and position of balancing mass for unbalanced rotating parts.
5	Create the profile of cam with various followers and pressure distribution profile of journal bearings.
6	Compare the function of governors and flywheels to control the engine speed.

Subject Code:LPCME-105

Subject Name: Applied Thermodynamics Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 4	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 1hr
Total Marks: 50	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Identify different types of IC engines and their parts; understand construction & working of IC engines.
2	Understand impact of valve timing on performance of IC engines.
3	Demonstrate the construction and working of different types of steam generators and their parts.
4	Evaluate the performance of steam generators.
5	Evaluate the performance of IC engines.
6	Demonstrate the construction and working of power plant parts like condensers.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code:LPCME-106 Subject Name: Fluid Mechanics & Machinery Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 4	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 1hr
Total Marks: 50	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Understand different concept of continuity equation and flow rate.
2	Analyze different form of energies in fluid flow and inter conversion.
3	Distinguish various types of flows and flow measurement methods.
4	Calculate the head losses associated with friction and pipe fittings
5	Suggest installations of hydraulic turbine depending on different requirements.
6	Understand working of various types of pumps and remedial solutions for different faults.

Subject Code:LPCME-107 Subject Name: Modern manufacturing process Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 4	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 1hr
Total Marks: 50	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes(CO)
1	Understand the concepts of CNC machine tools, their types and features
2	Generate part programs using CNC programming and simulation.
3	Evaluate the performance of drilling by CNC drill machine.
4	Understand the concept of additive manufacturing.
5	Understand the performance of EDM.
6	Evaluate the performance of electrochemical machine.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-110

Subject Name: Finite Element Method

Programme: B. Tech. (ME)	L: 2 T: 0 P: 0
Semester: 5	Teaching Hours: 24
Theory/Practical: Theory	Credits: 2
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 70%
External Marks: 60	Duration of End Semester Exam(ESE): 03Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Differentiate between various analysis methods and apply general analysis algorithm.
2	Formulate the governing equations required to state the problem in mathematical terms.
3	Understand the concepts of nodes and coordinate system.
4	Derive the shape function for the various elements and apply them.
5	Solve the equations formed in analysis procedure using different methods.
6	Analyse the problem of body like bar, truss, frame with FEM.

Subject Code: PCME-111

Subject Name: Design of Machine Elements

Programme: B. Tech.(ME)	L: 3 T: 1 P: 0
Semester: 5	Teaching Hours: 36
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 80%
External Marks: 60	Duration of End Semester Exam(ESE): 03Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand various types of design and criteria for selection of materials for different applications.
2	Apply various design considerations like stress concentration factor and factor of safety.
3	Understand various basic machine components under different loading conditions.
4	Analyse the fastening processes like bolting, welding, riveting etc. for different applications.
5	Evaluate machine members like transmission drives, levers, shafts, axles, keys, coupling and cotters etc. as per different requirements in the industry.
6	Create the design and suggest/apply suitable modifications in the design

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-112

Subject Name: Heat Transfer

Programme: B. Tech.(ME)	L: 3 T: 1 P: 0
Semester: 5	Teaching Hours: 36
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 80%
External Marks: 60	Duration of End Semester Exam(ESE): 03Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Recognize the predominant mode of heat transfer in various engineering applications.
2	Analyze the various heat transfer problems (mainly one dimensional under steady state condition) using basic laws of heat transfer and electrical analogy.
3	Develop mathematical relations to solve heat transfer problems.
4	Select and design the fins for various engineering applications.
5	Apply the basic laws of radiation and electrical network analysis to solve radiative heat exchange problems.
6	Design the heat exchangers by using the concept of conductive and convective (simple and phase change) heat transfer phenomenon.

Subject Code: HSMME-101

Subject Name: Operation Research

Programme: B. Tech. (ME)	L: 3 T: 0 P: 0
Semester: 5	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design Problems: 80%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes
1	Understand the characteristics of different types of operations research models in real-life environments.
2	Application of different types of deterministic and probabilistic models in finding real-life environments.
3	Design new simple models, like CPM, to improve decision making.
4	Implement the various OR tools for better decision making.
5	Identify and apply the appropriate operation research model.
6	Apply the Solver toolbox for getting quick results.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-113

Subject Name: Mechanical Measurement and Control

Programme: B. Tech.(ME)	L: 3 T: 0 P: 0
Semester: 5	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03Hrs
Total Marks: 100	Course Status: Compulsory

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1	Understand the concept of measurements and measurement standards used in industrial applications.
2	Apply the concept of static and dynamic characteristic of a measuring instrument.
3	Evaluate various errors in measuring systems by using statistical methods.
4	Understand the functions of sensors and transducers for their utility in instrumentation.
5	Use the instruments for measurements of pressure, flow, temperature etc. in manufacturing or process industry.
6	Analyze various control systems.

Subject Code: PCME-114

Subject Name: Industrial Automation and Robotics

Programme: B. Tech.(ME)	L: 3 T: 0 P: 0
Semester: 5	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the concept, need and application of hard automation, soft automation and their advantages.
2	Use the hydraulic and pneumatic valves and cylinders for their application in automation.
3	Design the pneumatic and hydraulic circuits for industrial automation applications.
4	Analyze the working of fluidic sensors for industrial applications.
5	Understand the working of various transfer devices and feeders in manufacturing industry.
6	Create a programme of robotic arm for industrial application.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: LPCME-108 Subject Name: Industrial Automation and Robotics Laboratory

Programme: B. Tech. (ME)	L: 0 T: 0 P: 2
Semester: 5	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE):02Hrs
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student shall be able to:

CO#	Course Outcomes(CO)
1	Understand the concept, need and application of hard automation, soft automation and their advantages.
2	Describe the constructional features, working and use of valves and their application in industrial automation.
3	Conceptualize and design the pneumatic and hydraulic circuits for industrial automation applications.
4	Describe the construction details and working of power steering of vehicles.
5	Analyse the simple pneumatic and hydraulic and electro pneumatic circuit using simulation software.
6	Operate the robotic arm to perform basic functions.

Subject Code: LPCME-109 Subject Name: Mechanical Measurement and Control Laboratory

Programme: B. Tech. (ME)	L: 0 T: 0 P: 2
Semester: 5	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE):02 Hrs
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student shall be able to:

CO#	Course Outcomes(CO)
1	Understand the basics of measurements and their needs in industry.
2	Measure dimensions, angles and shaft speed.
3	Measure the surface roughness of any metallic flat surface, pipe and rod.
4	Calibrate the pressure gauge and prepare a thermocouple.
5	Measures thread elements and gear elements.
6	Measure the effective diameter of external threads.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: LPCME-110

Subject Name: Heat Transfer Laboratory

Programme: B. Tech. (ME)	L: 0 T: 0 P: 2
Semester: 5	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE):02 Hrs
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student shall be able to:

CO#	Course Outcomes(CO)
1	Design and fabricate the experimental setups related to heat transfer phenomena.
2	Measure and analyse different heat transfer parameters.
3	Apply finite difference methods to solve simple heat transfer problems.
4	Perform experimentation on fabricated Experimental Set-up.
5	Assess relevance of prominent heat transfer mode in given circumstances.
6	Simulate various Heat Transfer situations by experimental techniques.

Subject Code: PCME-116

Subject Name: Refrigeration and Air Conditioning

Programme: B.Tech.(ME)	L: 3 T: 1 P: 0
Semester: 6	Teaching Hours: 36
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 80%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand and identify method/type of refrigeration and air conditioning systems.
2	Analyze and evaluate air refrigeration cycles and systems especially for aircraft air conditioning.
3	Analyze and evaluate vapour compression refrigeration cycle and system.
4	Identify the different refrigerants from their nomenclature and select them from environmental aspects and field of application.
5	Understand and determine psychrometric properties, evaluate various psychrometric processes and calculate cooling and heating loads for different domestic, commercial and industrial conditions.
6	Design air conditioning and refrigeration systems for various applications and select their components.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PCME-115

Subject Name: Mechanical Vibrations

Programme: B.Tech.(ME)	L: 3 T: 0 P: 0
Semester: 6	Teaching Hours: 36
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 80%
External Marks: 60	Duration of End Semester Exam(ESE): 03Hrs
Total Marks: 100	Course Status: Compulsory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Formulate mathematical models of problems in vibrations using Newton's second law or energy principles.
2	Understand the need and measurement of vibration in mechanical systems.
3	Calculate principal modes of vibrations.
4	Explore the suitable methods of vibration reduction and absorption.
5	Ability to determine vibratory responses of SDOF, MDOF and continuous systems
6	Create the mathematical model of a vibratory system to determine its response.

Subject Code: LPCME-112 Subject Name: Refrigeration and Air Conditioning Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 6	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 02 Hrs
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student shall be able to:

CO#	Course Outcomes(CO)
1	Understand and evaluate the performance of different types of refrigeration systems.
2	Estimate cooling and heating load of desired space for different refrigeration and air conditioning applications.
3	Understand the working of various commercial and industrial RAC systems.
4	Evaluate the performance of an air conditioning system.
5	Understand the importance of Psychrometric properties of moist air for an air conditioning system.
6	Recognize and select the different parts/components required for RAC systems.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: LPCME-111

Subject Name: Mechanical Vibrations Laboratory

Programme: B.Tech. (ME)	L: 0 T: 0 P: 2
Semester: 6	Teaching Hours: 24
Theory/Practical: Practical	Credits: 1
Internal Marks: 30	Percentage of Numerical/Design/Programming Problems:100%
External Marks: 20	Duration of End Semester Exam(ESE): 02 Hrs
Total Marks: 50	Course Status: Compulsory

On Completion of the course, the student shall be able to:

CO#	Course Outcomes(CO)
1	Determine the viscosity of fluid.
2	Determine radius of gyration of compound pendulum.
3	Determine natural frequency of simple structure.
4	Determine modulus of elasticity of given sample wire.
5	Demonstrate forced vibration.
6	Determine coefficient of dry friction.

Subject Code: PEME-103

Subject Name: Non-Conventional Energy Resources

Programme: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 6 th /7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Know various types of energy resources
2	Design various types of solar collectors and use solar energy applications for different systems
3	Understand principles of wind energy generation and estimate the power output
4	Know various types of direct energy conversion systems
5	Know types of biogas generators and their functioning
6	Understand applications of Geothermal , Tidal and wave energy

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Subject Code: PEME-104

Subject Name: Energy Conservation and Management

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Apply the basic knowledge of different engineering concepts and principles for energy conservation and management of system.
2	Evaluate the energy saving & conservation in different electrical and thermal utilities.
3	Understand efficient steam, thermal & electric power utilization, saving and energy recovery in these systems.
4	Prepare energy audit report for different energy conservation instances.
5	Understand Importance and role of Energy Manager/ Energy Auditor
6	Comprehend current global energy scenarios, various energy protocols and energy crisis.

Subject Code: PEME-110

Subject Name: Automobile Engineering

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Identify the different parts of the automobile and to know the terminology related to automobiles.
2	Understand various types of frames, chassis, power units, suspension systems and wheel tyre constructional details and their applications
3	Analyse the environmental implications of automobile emissions and their mitigation
4	Understand the working and application of fuel supply system and various characteristics of fuels.
5	Understand the working of various lubrication and cooling systems and rating/characteristics of lubricants and coolants
6	Understand the automated/manual transmissions, steering system with geometry, braking system, electronic and electric systems with complete vehicle maintenance.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-202

Subject Name: Product Design and Development

Programme: B.Tech. (ME)	L: 3 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 20%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Analyze, evaluate and apply the methodologies for product design, development and management.
2	Understand the technical and business aspects of the product development process.
3	Apply creative process techniques in synthesizing information, problem-solving and critical thinking.
4	Use basic fabrication methods to build prototype models for hard-goods and soft-goods and packaging.
5	Skilled in implementation of gathering data from customers and establish technical specification .
6	Apply technique of PDD Manufacturing.

Subject Code: PEME-209

Subject Name: Mechatronics

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Compulsory

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1	Understand key elements of mechatronics system.
2	Understand the functions and types of sensors and transducers.
3	Design the pneumatic and hydraulic circuits for industrial applications.
4	Understand the architecture and operation of typical microprocessors and microcontrollers.
5	Apply the concept of electrical ladder logic and its relationship to programmed PLC instruction.
6	Apply the Applications of mechatronics for real world.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-213

Subject Name: Computer Aided Design

Programme: B.Tech(ME)	L: 3 T:0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External marks: 60	Duration of End Semester Exam: 03 Hrs
Total Marks: 100	Course Status: Elective

On Completion of this course, students will have the ability to:

CO#	Course Outcomes
1	Describe the role of computer systems in design and manufacturing.
2	Understand geometric models, geometric modeling and apply various techniques.
3	Conceptualize the integration of Computer Aided Design and business aspects in an industry.
4	Analyse various curves and surfaces.
5	Evaluate component for kinematic analysis.
6	Understand different graphic packages.

Subject Code: PEME-204

Subject Name: Tool and Cutter Design

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Demonstrate the principle elements of cutting tools and tool geometry.
2	Evaluate the design elements and geometrical parameters of the tool life.
3	Develop in-depth knowledge of Twist drill geometry, construction and design.
4	Do analysis of correct profile of Form tools.
5	Explain the problems related to measurement of Milling and Broaching.
6	Explain the problems related to measurement of Reamers.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-301

Subject Name: Non-Traditional Machining

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 20%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the concept of latest technologies and need of Non-Traditional Machining processes in manufacturing.
2	Understand the principle, mechanism of metal removal of various non-conventional machining processes.
3	Analyze the various process parameters and their effect on the component machined on various unconventional machining processes.
4	Evaluate advantages, applications and limitations of the various non-traditional machining processes under different working conditions.
5	Understand the applications of different processes.
6	Select suitable process for stringent requirement of manufacturing industry

Subject Code: PEME-303

Subject Name: Computer Integrated Manufacturing

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th / 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the working of different computer graphics systems.
2	Apply Group technology and flexible manufacturing systems knowledge on various processes.
3	Use the computer in various stages of manufacturing: production, planning.
4	Apply the computer aided quality control on various processes.
5	Understand the working of the various production support machines and systems.
6	Understand the methodology of communication and planning in CIM.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-312

Subject Name: Non-Destructive Testing

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th / 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 20%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand and recognize various Non-Destructive Testing Methods (NDT) used for testing of engineering products.
2	Use NDT methods for detecting the flaws in specimen.
3	Suggest suitable NDT techniques for engineering products.
4	Understand the role and benefit of NDT for improving the quality of product.
5	Magnetic analysis of steel bars and tubing.
6	Measurement of thickness by ultrasonic method.

Subject Code: PEME-313

Subject Name: Heat Treatment Processes

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 6 th / 7 th / 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 20%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Course Status: Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Knowledge of Physical Metallurgy for the understanding theory of Heat Treatment.
2	Understanding Principles and Processes of Heat Treatment.
3	Grasping concepts of Hardenability and significance of suitable quenching media.
4	Comprehending Surface hardening and Thermo Chemical Heat Treatment Processes.
5	Understanding heat treatment Processes of Commercial steel, Cast Iron & Non-ferrous metals.
6	Insight into procedures for testing Heat treated components and energy economy in heat treatment processes.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: OEME-106

Subject Name: Industrial Engineering

Programme: B.Tech. (ME)	L: 3 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 40
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming – 0%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Open Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Know the functions and required qualities of an Industrial Engineer.
2	Apply work sampling and time study techniques for productivity improvement.
3	Identify and analyze the effect of working environment on worker's health.
4	Learn about relevant management concepts.
5	Decide and Manage the plant location and layout effectively.
6	Use modern techniques of industrial engineering for betterment of industry

Subject Code: OEME-105

Subject Name: Total Quality Management

Programme: B.Tech. (ME)	L: 3 T: 0 P: 0
Semester: 6 th / 7 th /8 th	Teaching Hours: 40
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming – 0%
External Marks: 60	Duration of End Semester Exam(ESE): 03 Hrs
Total Marks: 100	Subject Status: Open Elective

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the meaning of total quality management.
2	Understand the meaning of quality and industrial applications of total quality control.
3	Apply the various quality control tools.
4	Get the knowledge about different quality standards and their applications.
5	Understand the meaning of total quality management.
6	Understand the meaning of quality and industrial applications of total quality control.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-101

Subject Name: I. C. Engines

Programme: B.Tech(ME).	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 40-50
External Marks: 60	Duration of End Semester Exam (ESE): 03hours
Total Marks: 100	Course Status: Elective III

On completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand the concept Heat Engine and various Air-Standard cycles.
2.	Analyze the fuel-air and actual cycles and their response to influencing variables.
3.	Evaluate different types of conventional IC engine fuels, their combustion requirements.
4.	Design of carburetion and fuel injection system for SI and CI engines.
5.	Calculate various combustion stages and design requirements for combustion chambers of SI and CI engines.
6.	Apply their knowledge in measuring various performance parameters of IC engine.

Subject Code: PEME-102

Subject Name: Cryogenic Technologies

Programme: B.Tech(ME).	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 40-50
External Marks: 60	Duration of End Semester Exam (ESE): 03hours
Total Marks: 100	Course Status: Elective VI

On completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Evaluate cryogenic processes in details
2.	Understand the processes of cryogenic liquid production and their storage
3.	Analyze the effect of cryogenic manufacturing on material properties.
4.	Analyze with various cryogenic refrigeration cycles.
5.	Understand type of cryogenic insulation used during cryogenic manufacturing
6.	Design cryogenic manufacturing system for various applications

Subject Code: PEME-105

Subject Name: Fluid Dynamics

Programme: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 6 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems:40-50
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Course Status: Elective II

On completion of the course, the student will have the ability to:

CO #	Course Outcomes
1.	Understand the concept of potential flow theory and its application to flow.
2.	Calculate the theoretical Lift force for cylindrical and other shaped bodies.
3.	Apply Plain Couette flow to hydro-dynamic lubrication.
4.	Analyze Boundary layer stress and velocity distribution and drag forces

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5.	Evaluate the various forces on immersed bodies and effect of streamlining.
6.	Understand the compressible flow, Mach number, and Stagnation properties.

Subject Code: PEME-106

Subject Name: Heat Exchanger Design

Programme: B.Tech(ME).	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 40-50
External Marks: 60	Duration of End Semester Exam (ESE): 03hours
Total Marks: 100	Course Status: Elective V

On completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand the physics and the mathematical treatment of typical heat exchangers
2.	Apply LMTD and NTU methods in the design of heat exchangers
3.	Analyze effectiveness of heat exchangers
4.	Design and analyze the shell and tube heat exchanger
5.	Apply the principles of boiling and condensation in the design of boilers and condensers
6.	Design cooling towers from the principles of psychrometry

Subject Code: PEME-107

Subject Name: Solar Energy

Programme :B-Tech. (ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours:48
Theory/Practical: Theory	Credits:4
Internal Marks: 40	Percentage of numerical/design/programming problems:10-20
External Marks: 60	Duration of end semester exam: 3 hrs
Total Marks: 100	Course Status : Elective III

On completion of subject students will have the ability to:

CO#	Course Outcomes(CO)
1	Fundamentals of solar radiations and measurement techniques
2	Identify different methods of calculation of solar radiation availability at a given location
3	Make critical comparison of different solar energy systems
4	Explain the technical and physical principles of solar cells and solar collectors
5	Calculate load for energy conversion devices and solar energy sources.
6	Understand how and where to implement solar energy sources for solar energy to electricity conversion.

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Subject Code: PEME-108

Subject Name: Power Plant Engineering

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Subject Status: Elective IV

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand energy sources for power generation and principles types of power plants.
2	Compare essential features and types of hydro-electric and nuclear power plant.
3	Understand about essential features of steam power plant and also have knowledge about coal and ash handling systems.
4	Compare I.C engines and its performance with other plants.
5	Evaluate of load factor, capacity factor, average load and peak load on power plant.
6	Analyze and give suggestion for direct energy conversion systems.

Subject Code: PEME-109

Subject Name: Computational Fluid Dynamics

Programme: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems:40-50
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Course Status: Elective IV

On completion of the course, the student will have the ability to:

CO #	Course Outcomes
1.	Understand the concept of numerical modeling, applications of CFD to various engineering fields.
2.	Apply conservation principles to derive various flow-governing equations, their mathematical nature and various boundary conditions.
3.	Understand basic discretization techniques: finite difference and finite volume methods.
4.	Analyze various numerical schemes: concept of consistency, stability and convergence, error and stability analysis.
5.	Solve linear algebraic equations by TDMA, QUICK scheme, SIMPLE algorithm for various types of fluid flow problems.
6.	Run 1-D/2-D flow simulations on available commercial/open source software.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-111

Subject Name: Gas Dynamics

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 20-30
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective V

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand basic concept and importance of gas dynamics
2.	Analyze the basic fundamental equations of one dimensional flow of compressible fluid and isentropic flow of an ideal gas.
3.	Analyze the steady one-dimensional is entropic flow; frictional flow and isothermal flow and express the concepts of steady one dimensional flow with heat transfer.
4.	Evaluate the effect of heat transfer on flow parameters.
5.	Compare the jet propulsion engines.
6.	Design basic structure of rocket propulsion.

Subject Code: PEME-201

Subject Name: Design for X

Programme: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective III

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Analyse and come up with solutions based on the engineering design aspects.
2	Identify the need to analyse the engineering design aspects that should be considered.
3	Design for manufacturing and assembly (DFMA), design for additive manufacturing, robust design, design for environment (DfE)
4	Manage the production of the necessary basis for a previously unknown "X"
5	Design solution that has been developed and based on that, be able to offer recommendations for further and/or alternative design solutions.
6	Analyses of the proposal that has been developed, including further development of the available DfX data.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-203

Subject Name: Machine Tool Design

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Subject Status: Elective IV

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the various requirements of the machines.
2	Design various feed drives and spindle drives design on the basis of varying load conditions.
3	Enhance the knowledge regarding the manufacturing aspects of the machining.
4	Analyze machine tool dynamics.
5	Evaluate the purpose and principal of tool geometry, construction and design.
6	Design machine tools control system which will further help in recognizing the different operational conditions on the machine.

Subject Code: PEME-205

Subject Name: Experimental Stress Analysis

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Subject Status: Elective VI

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand and explain the elastic behaviour of solid bodies.
2	Apply the photo elastic techniques to characterize the elastic behaviour of the solids.
3	Apply coatings techniques to determine stresses and strains.
4	Describe stress strain analysis of mechanical systems using electrical resistance strain gauges.
5	Apply experimental methods of determining stresses and strains induced.
6	Analyse and reduce the brittle coating defects.

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2018 Admission Batch Onwards**

Subject Code: PEME-206

Subject Name: Industrial Tribology

Program: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective IV

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the surface and sub-surface constituent layers in engineering materials.
2	Analyze various methods for quality checking of engineering applicable surfaces.
3	Understand the theories and rigs accounting friction and Wear.
4	Analyze the variation of friction and wear in metals and non-metals.
5	Apply various lubrication systems and bearing for different working conditions.
6	Analyze causes of failure of tribological components.

Subject Code: PEME-207

Subject Name: Theory of Plasticity

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours:48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 30-40
External Marks: 60	Duration of End Semester Exam (ESE): 3hours
Total Marks: 100	Elective Status: Elective VI

On completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Apply knowledge of the theory of plasticity and flow rules.
2.	Analyze the generalization of the one-dimensional model to general states of stress and strain.
3.	Apply the load bounding theorem to plane strain problems.
4.	Design and model of a material undergoing permanent deformation upon loading.
5.	Evaluate various theories of failures.
6.	Apply the applications of slip line field theory.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-208 /PEME-316 Subject Name: Process Planning and Cost Estimation

Program: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective IV

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Classify the process, equipment and tools for various industrial products.
2	Analyze process planning activity chart.
3	Apply various quality techniques in process planning
4	Calculate cost estimation for different processes.
5	Create job order cost for different type of shop floor.
6	Calculate the machining time for various machining operations.

Subject Code- PEME-210

Subject Name: Finite Element Method

Program: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/ Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective III

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand the procedure involved to solve a problem using Finite Element Methods.
2	Apply and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element.
3	Develop the element stiffness matrices using different approach
4	Apply suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
5	Analyze a 2D problem using line, triangular, axisymmetric and quadrilateral element.
6	Analyze a 3D problem using tetrahedral and hexahedral elements.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-211

Subject Name: Modeling and Simulation

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 30-40
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective V

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Apply techniques of modeling in the context of hierarchy of knowledge about a system.
2.	Create the physical modeling of system and modeling of system with known structure.
3.	Apply the optimization techniques effectively.
4.	Apply the neural modeling to various systems.
5.	Apply different types of simulation techniques.
6.	Design the models for the purpose of optimum control.

Subject Code: PEME-212

Subject Name: Optimization Techniques

Programme: B.Tech. ME	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 70-80
External Marks: 60	Duration of End Semester Exam (ESE): 3hours
Total Marks: 100	Elective Status: Elective V

On completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand the characteristics of different types of operations research and optimization models in real-life environments.
2.	Application of different types of deterministic and probabilistic models in finding real-life environments.
3.	Design new simple models, like CPM, to improve decision making.
4.	Apply the various OR tools for better decision making.
5.	Identify and apply the appropriate operation research model.
6.	Apply the replacement and network models in real problems.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-214

Subject Name: Microprocessors in Automation

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 6 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective II

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand the concept of automation.
2.	Design the pneumatic and hydraulic system for a given application in automation.
3.	Describe the architecture, features and functioning of microprocessor
4.	Understand the concepts of different parameters included in 8085 processor.
5.	Apply the knowledge of instruction set for performing various operations on microprocessor.
6.	Select microprocessor for a particular application.

Subject Code: PEME-215

Subject Name: Design of Transmission Systems

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 80-90
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Subject Status: Elective III

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Design flexible elements like belt, ropes and chain drives for engineering applications.
2	Design of spur and helical gear drives for power transmission.
3	Design bevel and worm drives for power transmission.
4	Design multi speed gear box for machine tool and automotive applications.
5	Design clutch and brake systems for engineering applications.
6	Design and analyze the whole transmission system.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-302

Subject Name: Modern Welding & Forming Processes

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective IV

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Apply suitable welding process and technique to join a given material.
2.	Analyze the distortion and residual stresses induced in weldments.
3.	Design for both static and fatigue loading conditions.
4.	Apply suitable welding automation for the production of engineering components.
5.	Understanding of metal forming process.
6.	Formulate relevant research problems, conduct experimental and/or analytical work and analyze results using modern mathematical and scientific methods.

Subject Code- PEME-304

Subject Name: Computer Aided Process Planning

Program: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective VI

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Understand and explain the difference between traditional and computer aided process planning.
2	Apply group technology concepts.
3	Analyze the effect of experience on various design approaches.
4	Elaborate production systems at operation and plant level.
5	Explain different aspects of automated process planning.
6	Consideration of different production families for integrated planning.

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code: PEME-305

Subject Name: Machining Science

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Subject Status: Elective III

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Elaborate the conceptual significance of conventional material removal in manufacturing.
2	Apply basic principles of science to correlate the input parameters of conventional machining processes with output parameters like cutting forces, power, tool life etc.
3	Solve problems and derive theoretical relations related to mechanics of metal machining.
4	Develop procedure for experimental determination of cutting force, temperature and tool life by using suitable equipment.
5	Analyze and optimize machining processes.
6	Suggest remedial measures to reduce the harmful ecological impact of machining processes.

Subject Code: PEME-306

Subject Name: Rapid Prototyping

Programme: B.Tech. (ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems:
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Subject Status: Elective III

On completion of the course, the student will have the ability to:

CO#.	Course Outcomes (Cos)
1	Understand the concept of Rapid prototyping and its importance in today's industry
2	Classify various rapid prototyping techniques based upon their principles and processes.
3	Describe different errors in rapid prototyping to improve the overall working of manufacturing.
4	Discuss various case studies of rapid prototyping in different fields of manufacturing.
5	Illustrate implementation of rapid prototyping in biomedical field.
6	A various technologies related to Rapid prototyping in medical field

**B. Tech. (Mechanical Engineering)
2018 Admission Batch Onwards**

Subject Code- PEME-307

Subject Name: Characterization of Materials

Program: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective IV

On completion of the course, the student will have the ability to:

CO#.	Course Outcomes (CO)
1	Understand and use basic concepts of testing the material and their study.
2	Apply various techniques to study the internal structure of the material.
3	Recognize the spectroscopic behaviour of the material under various conditions of material development.
4	Evaluate and analyze the performance of material under the effect of temperature cycles.
5	Conclude upon the method of development by studying the behavior of the material under various conditions.
6	Analyze the dynamic behaviors of the material.

Subject Code- PEME-308

Subject Name: Surface Science

Program: B.Tech.(ME)	L: 4 T: 0 P: 0
Semester: 6 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Course Status: Elective II

On completion of the course, the student will have the ability to:

CO#.	Course Outcomes (CO)
1	Understand the concept of surfaces and their structure.
2	Apply different technologies to read the surface.
3	Analyze the effect of adsorption and desorption.
4	Elaborate different modes of growth in the solids.
5	Evaluate the structural defects at the surfaces.
6	Understand and apply different laws and methods to study the surface diffusion.

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Subject Code: PEME-309

Subject Name: Modern Casting Processes

Programme: B.Tech(ME)	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal marks: 40	Percentage of Numerical/Design Problems: 10-20
External marks: 60	Duration of End Semester Exam: 3hrs
Total Marks: 100	Course Status: Elective V

On Completion of this course, students will have the ability to:

CO#	Course Outcomes
1	Understand and apply the principles of metal casting processes and develop analytical relation between input and output process parameters.
2	Analyze and apply the concept of cooling rate of materials in metal casting.
3	Apply theoretical and experimental techniques for measurement of important outcomes of casting processes like hardness, dimensional accuracy etc.
4	Design the model of casting economics and optimization and its measurement.
5	Apply the fundamentals of physics to develop theoretical relations for different types of casting processes.
6	Analyze and design the Mechanization in Foundries for different processes.

Subject Code: PEME-310

Subject Name: Micromaching Technologies

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective III

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Explain role of computers and information technology in Micromaching Technologies.
2.	Demonstrate the capability of selecting suitable manufacturing processes to manufacture the products optimal.
3.	Apply the techniques, skills and tools such as CIM, CAPP, CAI, CMM.
4.	Design micro systems and know different micro fabrication system.
5.	Understand the properties and microstructure of materials.
6.	Understand principle of microsystems and feedback systems.

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Subject Code: PEME-311

Subject Name: Manufacturing Systems

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 46 Hours
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective VI

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Analyze role of computers and information technology in manufacturing systems.
2.	Design control system in instrumentation and manufacturing.
3.	Apply the techniques, skills and tools such as CIM, CAPP, CAI, and CMM.
4.	Evaluate the use of robotics, and recent advances in the field of manufacturing.
5.	Develop an FMS (Flexible Manufacturing System) layout for given simple part family, using group technology concepts to and make proper grouping as per their attributes.
6.	Apply the Applications of rapid prototyping for real world.

Subject Code: PEME-314

Subject Name: Plastic Technologies

Programme: B.Tech. ME	L: 4T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective IV

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Analyse properties of plastic material according to requirement.
2.	Understand the advantage of using plastic over other materials.
3.	Design various products for different application as a plastic material.
4.	Apply different processes to convert plastic in finished good.
5.	Analyse the plastic storage problems.
6.	Analyse and reduce the problems such as flammability, toxic fumes, limitation of working under heat etc.

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Subject Code: PEME-315

Subject Name: Composite Materials

Programme: B.Tech.	L: 4 T: 0 P: 0
Semester: 8 th	Teaching Hours: 48
Theory/Practical: Theory	Credits: 4
Internal Marks: 40	Percentage of Numerical/Design Problems: 10-20
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Elective V

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand the applications of composite materials.
2.	Identify various constituents of composite materials and their characteristics.
3.	Suggest and use standard methods for determining mechanical properties of different types of composite materials.
4.	Apply various techniques for processing of composite materials.
5.	Apply the basic concepts of micro-mechanics of composite laminates.
6.	Analyze failure modes of composite.

Subject Code: OEME-101

Subject Code: Industrial Safety and Environment

Programme: B.Tech.	L: 3 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 36 Hours
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design Problems: 0%
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Open Elective II

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Use and design safety equipment /systems effectively.
2.	Understand the methods of hazard identification and preventive measures
3.	Apply the methods of prevention of fire and explosions.
4.	Understand the control and relief and methods.
5.	Maintain the safer environment in the industry

Subject Code: OEME-102

Subject Name: Management Information System

Programme: B.Tech.	L: 3 T: 0 P: 0
Semester: 8 th	Teaching Hours: 36 Hours
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design Problems: 0%
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Open Elective III

On Completion of the course, the student will have the ability to:

CO	Course Outcomes
1.	Understand the need of MIS in organization, business process integration with IT
2.	Understand SCM, CRM, ESS, DSS, EDI & E-Commerce
3.	Identify, formulate and implement different strategies for competitive advantage
4.	Study and analyze the Business Intelligence techniques

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5.	Monitor the challenges and changes in IT in an organization
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Subject Code: OEME-103

Subject Name: Entrepreneurship

Programme: B.Tech.	L: 3 T: 0 P: 0
Semester: 6 th	Teaching Hours: 36 Hours
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design Problems: 0%
External Marks: 60	Duration of End Semester Exam(ESE): 3hours
Total Marks: 100	Elective Status: Open Elective I

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Concept and theories of entrepreneurship and its role in economic development.
2.	Develop business plan and identify the reasons of failure of business plans.
3.	Illustrate the steps in starting MSME.
4.	Comprehend government policies and regulatory framework available in India to facilitate the process of entrepreneurial development.
5.	Identify different sources of finance for new enterprises and assess the role of financial institutions and various government schemes in entrepreneurial development
6	Assess the role of financial institutions and various government schemes in entrepreneurial development

Subject Code: OEME-104

Subject Name: Operations Management

Programme: B.Tech. (M.E.)	L: 3 T: 0 P: 0
Semester: 8 th	Teaching Hours: 36 Hours
Theory/Practical: Theory	Credits: 3
Internal Marks: 40	Percentage of Numerical/Design/Programming Problems: 10%
External Marks: 60	Duration of End Semester Exam(ESE): 3hr
Total Marks: 100	Status: Open Elective III

On completion of the course, the student will have the ability to:

CO#.	Course Outcomes (Cos)
1	Apply knowledge of mathematics, science and engineering.
2	Design and conduct experiments, as well as to analyze and interpret data.
3	Design a system, process to meet desired needs within realistic constraints.
4	Function on multidisciplinary teams.
5	Design and maintain the systems.
6	Plan, control and execute the different duties in an organization.

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Subject Code: MCME-101

Subject Name: Environmental Science

Programme: B.Tech. (ME)	L: 2 T: 0 P: 0
Semester: 7 th /8 th	Teaching Hours: 26
Theory/Practical: Theory	Credits: 0
Internal Marks: 40+10	Percentage of Numerical/Design/Programming Problems: 0%
External Marks: Nil	Duration of End Semester Exam(ESE):
Total Marks: 50	Subject Status: Mandatory

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Measure environmental variables and interpret results.
2	Evaluate local, regional and global environmental topics related to resource use and management.
3	Propose solutions to environmental problems related to resource use and management.
4	Interpret the results of scientific studies of environmental problems.
5	Describe threats to global biodiversity, their implications and potential solutions.