

- perform practice jobs related to metal forming and welding processes by applying theoretical knowledge acquired.

ME404

Fluid Mechanics

[3 0 2 4]

Course Learning Outcome:

After successful completion of the course, student will be able to

- develop an understanding of the fundamental principles of fluid mechanics and related applications.
- learn the fundamentals of fluid statics, kinematics and dynamics and their applications.
- study the fundamentals of pressure measurements, flow measurements and their calibration aspects.
- understand the necessity and concept of dimensional analysis, boundary layer and compressible flow.

ME405

Seminar

[0 0 2 1]

Course Learning Outcome:

After successful completion of the course, student will be able to

- learn independently topic of interest
- develop presentation and communication skills through presentation
- develop writing skills through report presentation based on study

ME501

Dynamics of Machinery-II

[3 0 2 4]

Course Learning Outcome:

After learning this course, student will be able to

- derive the equations of motion for arbitrary linear single D.O.F. system, 2 D.O.F. and multi D.O.F. systems and solve the equation of motion.
- apply the concept of resonance, self-excited vibrations, and motion and force transmission in mechanical systems
- apply the concept of vibration isolation and absorption of mechanical vibration.
- estimate the unbalance for different rotating and reciprocating mechanical systems analytically and experimentally

ME502

Power Plant Engineering

[4 0 0 4]

Course Learning Outcome:

After successful completion of the course, student will be able to

- comprehend construction and working of various components of coal based thermal power plant.
- analyze performance parameters of steam and gas turbines.
- understand construction and working of nuclear power plant.
- comprehend the pollution problem from thermal power plant and its control methods.

ME503**Fluid Power Engineering****[3 0 2 4]****Course Learning Outcomes:**

After successful completion of the course, student will be able to

- demonstrate the applications of impact of jet for various hydraulic machines.
- understand the basics and working of hydropower stations and its components.
- evaluate the performance of hydro turbo machines.
- analyse the performance of various compressors.
- apply fundamentals of hydraulics to different hydraulic systems.

ME504**Heat and Mass Transfer****[3 0 2 4]****Course Learning Outcomes:**

After successful completion of the course, the student will be able to

- comprehend the principles of heat transfer by various modes such as conduction, convection and radiation.
- define and solve steady-state and transient problems in heat transfer.
- appreciate the usage of analytical and numerical methods in solving conduction heat transfer problems.
- apply principles of heat transfer in the working and analysis of heat exchangers.
- comprehend the basic principles of boiling, condensation and mass transfer.

ME505**Control Engineering****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- formulate the mathematical model for the mechanical system through various tools like nodal diagram, block diagram and signal flow diagram
- estimate system response characteristics, steady state error and stability for first and second order system analytically
- identify the various components of hydraulic and pneumatic system and their use in circuit design
- select various control action and suitable controller for the application.

ME506**Mini Project - I****[0 0 2 1]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- practice acquired knowledge within the chosen area of technology for project development
- identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
- reproduce, improve and refine technical aspects for engineering projects
- work as an individual or in a team in development of technical projects
- communicate and report effectively project related activities and findings

ME601**Production Technology****[3 0 2 4]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- understand types of tools, their geometries and cutting fluids used for various machining processes
- select and justify machining parameters for practical applications
- design Jig and Fixtures for various application
- perform on automatic and unconventional machines

ME602**Machine Design-I****[3 0 2 4]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- apply various design concepts like Design for Assembly, Design for Manufacturability in their design problems.
- design basic machine elements like pressure vessel, welded joints and riveted joints to withstand loads and deformations for a given application, while considering additional specifications.
- evaluate the life of mechanical components subjected to fluctuating loading
- design mechanical systems like hydraulic press, single plate clutch, multiplate clutch, centrifugal clutch and mechanical brakes

ME603**Thermal Engineering****[3 0 2 4]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- understand various refrigeration system and analyze its performance
- review basics of psychometry and apply it to related processes
- comprehend the fundamentals of I C engine and its various sub systems
- analyze performance of I C engine
- understand properties and characteristics of traditional fuel and alternate fuels used in I C Engine

ME604**Mini Project- II****[0 0 2 1]****Course Learning Outcome:**

After successful completion of the course, students will be able to

- practice acquired knowledge within the chosen area of technology for project development
- identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach
- reproduce, improve and refine technical aspects for engineering projects
- work as an individual or in a team in development of technical projects
- communicate and report effectively project related activities and findings

ME701**Computer Aided Design****[3 0 2 4]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- determine specification of input and output devices for computer systems and CAD/CAM/CAE software for mechanical engineering requirements.
- apply knowledge of mathematical concepts for geometry manipulation, modeling of curves, surface solids.
- evaluate geometric modelling and finite element formulation

ME702**Machine Design - II****[3 0 2 4]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- prepare assembly drawing after design the components and preparation of manufacturing drawings for the same.
- apply rigidity concepts for design of various components of machine tools
- evaluate spur, helical, bevel and worm gears on the endurance strength basis
- design material handling equipments
- design various components of IC engine and selection of bearings

ME561

Facility Layout

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- comprehend different facility location and layout techniques
- explore different material handling methods used in industries.
- evaluate and select the appropriate plant location based on different criteria.
- apply facility location and layout technique to various area.

ME571

Advanced Machining Methods

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand and compare various non-traditional manufacturing processes.
- evaluate various parameters on performance of various non-traditional manufacturing processes.
- select a non-traditional manufacturing processes for given application.
- devise a mathematical model for non-traditional manufacturing processes.

ME581

Advanced Welding Technology

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand newer welding technologies and their applications
- analyze factors affecting process selection and performance
- comprehend physics of welding process and weld design aspects
- appreciate the role of weld drawing, specifications, inspection and quality control in welding

ME591

Flexible Manufacturing Systems

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- decide the need of flexible manufacturing system for various applications.
- understand the fundamentals and linkage between flexible manufacturing system and computer integrated manufacturing.
- select and develop database management system for computer integrated manufacturing.
- compare the different technology of manufacturing automation.

ME612

Quality Engineering

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- appreciate quality aspects used in industries.
- understand the various quality systems and improvement tools.
- analyse experimental data using statistical analysis.
- address quality related problems using quality improvement tools.

ME622

Operation Research

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand managerial issues related to resource utilization
- acquire knowledge for quantitative analysis.
- develop mathematical models and analyse Operations Research problems.
- apply Operation Research approaches in solving real life problems.

ME632

Tool Engineering

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand principles of Jig, fixture and gauge design
- implement design aspects for practical applications
- develop tooling for press work using appropriate software
- design and analyze principles of plastic molding tools

ME642

Maintenance Engineering

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- acquire the knowledge of maintenance job and technology.
- understand various maintenance methods & systems.
- select the condition monitoring techniques for given application.
- evaluate and implement the philosophy of total productive maintenance and computer managed maintenance system.

Design Engineering

ME613

Stress Analysis

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- relate stress, strain and material behavior.
- evaluate the suitable stress functions.
- evaluate stresses and strains in mechanical structural components.
- select the suitable experimental technique for stress analysis.

ME623

Hydraulics and Pneumatics

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- identify the various components of hydraulic and pneumatic system
- design a preliminary control circuit using hydraulic and pneumatic symbols
- select the appropriate components suitable for the application.

ME633**Advanced Mechanical Vibrations****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- evaluate vibratory response of multi degree freedom systems and continuous systems.
- formulate the mathematical models of real life engineering systems for vibration study.
- characterize the dynamic behavior of a structure in terms of its modal parameters.

ME643**Robotics Engineering****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- apply the concept of robotics to select the type of manipulator best suitable to the application
- formulate the mathematical relations for kinematic analysis of robotic manipulator.
- integrate the structural design, actuator selections, drive system, sensor and control system necessary to implement a robot in a specific job task

ME653**Machine Tool Design****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- design structure of machine tools such as bed, column, housing etc.
- select the configuration of speed and feed regulation for required application.
- design the components of machine tool like spindle and guide ways.

ME663**Mechanism Analysis & Design****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- evaluate kinematic parameters of mechanism
- design mechanisms for required applications
- evaluate mechanisms statically and dynamically under the action of various loading.

ME673**Fatigue, Creep and Fractur****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- understand of the mechanics and micro-mechanisms of elastic and plastic deformation, creep, fracture, and fatigue failure, as applied to metals, ceramics, composites
- apply the concepts of fracture mechanics in design of life prediction strategies and for fracture control plans, with examples from the automotive, aerospace, medical, and other industries.
- evaluate the fatigue life of the component

ME683**Industrial Design****[3 0 0 3]****Course Learning Outcome:**

After successful completion of the course, student will be able to

- apply the concepts of product planning and concept development for a product
- apply the ergonomic considerations for design a components
- recognise the importance of aesthetic in design
- create a new product based on the current market scenario.

ME693

Failure Analysis

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- interpret the mode of failure based on fractured surface.
- relate the loading condition with failure of a component.
- devise the methodology for prevention of failures.

ME652

Tribology

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- appreciate the role of friction, wear and lubrication in the failure of mechanical components.
- relate the structure of bearing and corresponding nature of fluid flow.
- estimate the loads for various modes of lubrication.
- plan preventive measures for minimization of wear.

Thermal Engineering

ME714

Alternative Energy Sources

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand the importance of Alternative Energy Sources in the present era.
- describe various methods for power generation by using different type of Non-conventional energy sources.
- apply the knowledge of converting energy resources like solar, wind , biomass, tidal, wave, ocean thermal, and geothermal energy for power generation.
- appreciate the working and applications of fuel cells.

ME724

Advanced Thermodynamics

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- comprehend entropy concepts for various systems.
- understand exergy concepts and apply it to various processes.
- apply principles of thermodynamics to chemical reactions.
- derive and demonstrate use of thermodynamic relations.

ME734

Gas Dynamics

[3 0 0 3]

Course Learning Outcomes:

After successful completion of the course, student will be able to

- comprehend the fundamentals of the compressible flow and rarefied gas dynamics.
- apply the fundamentals of one dimensional isentropic flow to variable area duct.
- analyse the principles of normal shock formation and its effects.
- relate the principles of compressible flow to constant area duct subjected to friction/heat transfer.
- evaluate the forces acting on submerged bodies.

ME744

Heat Exchangers

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- comprehend laws of thermodynamics, heat transfer and fluid mechanics and apply it to thermal design of heat exchanger.
- apply basic concepts related to selection and rating of heat exchanger.
- design heat exchangers considering the concepts of pressure drop calculations.
- evaluate the effect of fouling on performance of heat exchanger

ME754

Introduction to Computational Fluid Dynamics

[3 0 0 3]

Course Learning Outcomes:

After successful completion of the course, the student will be able to

- review the required underlying basic concepts in mathematics and fluid mechanics.
- understand the basic concepts of Finite Difference and Finite Volume Methods.
- comprehend the methodology and algorithms of CFD analysis.
- apply concepts of CFD for problem solving

ME764

Internal Combustion Engines

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand various aspects of combustion in SI and CI engines.
- comprehend the related theories, working and construction details of various systems/subsystems of IC engines.
- apply basic engineering principles in solving IC engines related problems.
- evaluate engine emissions and its control techniques, alternate fuels, performance tests for IC engines and advancements in IC Engines.

ME774

Refrigeration Engineering

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand desirable properties of refrigerant and VCR system and its components.
- comprehend and analyse multipresure and vapour absorption systems.
- understand low temperature and unconventional refrigeration systems.
- estimate cooling load in refrigeration system.

ME784

Vacuum Engineering

[3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand basics of vacuum technology and describe various methods for producing vacuum, according to its level and application.
- comprehend the working principle of different vacuum pumping systems and their features.
- appreciate the functions and working of different vacuum measuring instruments and vacuum system accessories.
- comprehend the methods of leak detection in vacuum systems.

ME794

Automobile Engineering [3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand the various forces acting on automobiles and apply the related basic principles of engineering to it.
- comprehend the application, working and construction details of various automobile systems/subsystems.
- apply the knowledge of automobile systems/subsystems for troubleshooting and remedy.
- appreciate various air pollution control techniques used in automobiles and basic automobile laws.

ME662

Air Conditioning Engineering [3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- understand the basics of psychometric process and human comfort.
- estimate the cooling load of a space to be air conditioned.
- design air distribution and air handling systems for air conditioning system.
- understand the principle, construction and working of humidifiers and dehumidifiers.
- comprehend the working of various air conditioning control systems.

ME672

Theory & Design of Steam and Gas Turbines [3 0 0 3]

Course Learning Outcome:

After successful completion of the course, student will be able to

- apply basic concepts of thermodynamics to design the steam nozzle
- analyze the flow characteristics through nozzle and turbine.
- design (thermal) the various components of steam and gas turbine and evaluate the performance of the system
- comprehend construction details of gas turbine system and analyze its performance

ME682

Cryogenics [3 0 0 3]

Course Learning Outcome:

After successful completion of the course, the student will be able to

- describe various methods to produce low temperature and phenomena at cryogenic temperature.
- understand the working principle of different cryogenic refrigeration and liquefaction system.
- comprehend the functions and working principles of insulations and various low temperature measuring and storage devices.
- appreciate the application of Cryogenic technology in engineering and industry.

ME692

Introduction to Aircraft Systems [3 0 0 3]

Course Learning Outcomes:

After successful completion of the course, the student will be able to

- appreciate the Aerospace Industry and its evolution.
- understand the basic Principles of Flight.
- apply the basic laws of Fluid Mechanics and elementary Thermodynamics for aircraft applications
- comprehend the working of Aircraft Systems/sub-systems.