M.Tech. Mechanical Engineering (CAD/CAD)

3ME31117   **Analysis of Manufacturing Processes**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. evaluate and select of casting and welding processes by considering the related parameters for specified component,
2. evaluate and select machining and metal forming processes by considering the related parameters for specified component,
3. devise a mathematical model for various manufacturing processes,
4. select and apply modern engineering tools and techniques for analysis of manufacturing processes.

3ME3111   **Computer Aided Design**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. select input and output devices for computer systems for mechanical engineering requirements,
2. apply knowledge of mathematical concept for geometry manipulation and modeling of curves, surface and solids,
3. operate CAD packages to prepare solid model of components, assemble them to represent complex mechanical systems,
4. develop computer algorithm for design and analysis of mechanical systems

3ME3112   **Advanced Machine Design**   **[2 1 0 3]**

Course Learning Outcomes (CLOs):

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

1. design various mechanical systems incorporating the effect of fatigue, creep and fracture mechanics,
2. incorporate friction, wear and lubrication consideration in the design,
3. design the components of overhead crane.

3ME3113   **Advanced Theory of Machines**   **[2 1 0 3]**

Course Learning Outcomes (CLOs):

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

1. apply principles of kinematic analysis and dynamics to planer mechanisms.
2. understand fundamentals of mechanisms syntheses for specific applications.
3. formulate the mathematical models of real life engineering systems for vibration study.
4. interpret the vibratory responses of multi degree of freedom systems and continuous system through experiments.

3ME3114   **Industrial Automation**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. demonstrate use of hard automation for industrial application,
2. interpret the hydraulic and pneumatic systems,
3. evaluate and select an appropriate automation system for industrial automation, design an automatic system for a manufacturing system.

3ME1213   **Computer Aided Manufacturing**   **[3 0 2 4]**

Course Learning Outcomes (CLOs):

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

1. illustrate the basic principles of part programming for CNC machining,
2. select and apply appropriate operations, cutting parameters, cutting tools and software to machine a part,
3. create and optimize a part program for machining a component,
4. justify the importance of FMS and CIM in manufacturing industry.

3ME3215   **Minor Project**   **[0 0 10 5]**

Course Learning Outcomes (CLOs):

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

1. compile information related to recent trends in the industry and society,
2. formulate the problem definition,
3. design, implement, test and verify the proposed solution related to problem definition,
4. compile, comprehend and present the work carried out,
5. mange the project within the given timeline

Department Elective Courses

3ME12D101   **Robotics Engineering**   **[3 0 2 4]**

Course Learning Outcomes (CLOs):

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

1. interpret the robot specification, classification, components and technology to select the suitable manipulator for an application under consideration,
2. analyze the motion of robots in spatial coordinate representation and spatial transformation to carry out kinematic analysis,
3. estimate the trajectory, velocities and gripper forces for robotic manipulator,
4. integrate the structural design, actuator selections, drive system, sensor and control system necessary to implement a robot in a specific job task.

3ME12D102   **Condition Monitoring of Machines**   **[3 0 2 4]**

Course Learning Outcomes (CLOs):

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

1. appreciate the basics of machinery condition monitoring techniques and its application,
2. analyze the signals from machine to monitor its condition,
3. select appropriate tools and processes for machinery condition monitoring,
4. develop the condition monitoring system for a given application.

3ME12D103   **Computer Aided Production and Quality**   **[3 0 2 4]**
Management

Course Learning Outcomes (CLOs):

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

1. utilize principles of production management,
2. formulate and solve forecasting and scheduling problems for the given situation using computational tools,
3. evaluate the inventory models for various applications,
4. analyze and interpret the quality issues using statistical software

3ME12D104   **Mechatronics**   **[3 0 2 4]**

Course Learning Outcomes (CLOs):

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

1. infer the need of mechatronics system,
2. explain functionality of various sensors, actuators and controllers used in mechatronics system,
3. utilize mechatronics components for the given application,
4. design and analyze mechatronics system.

3ME12D201   **Pressure Vessel and Piping Design**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. explain fundamentals of pressure vessel and piping design,
2. make use of the codes (ASME section VIII) for pressure vessels and piping design,
3. analyze pressure vessels and piping for internal and external pressure,
4. design various components of pressure vessel and piping subjected to fluctuating load.

3ME12D202   **Applied Computational Methods**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. formulate mathematical models pertaining to various engineering problems.
2. solve linear and non-linear systems of equations.
3. analyze experimental data using curve fitting and interpolating techniques.
4. evaluate integrals and differential of functions and equations using numerical methods.

3ME12D203   **Advanced Engineering Materials**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. analyze the micromechanical and macromechanical behaviour of composite materials,
2. select the suitable method of manufacturing for composite materials,
3. evaluate the utility of smart materials for given applications,
4. choose suitable parameters and modules for development of smart systems.

3ME12D204   **Decision Modelling**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. illustrate managerial issues related to resource utilization,
2. show the use of quantitative and statistical analysis for given data
3. develop mathematical models for decision making problems,
4. make use of network analysis for project management.

3ME12D205   **Fracture Mechanics**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. predict material failure for any combination of applied stresses,
2. estimate failure conditions of a structure,
3. determine the stress intensity factor for components of simple geometry,
4. predict the likelihood of failure of a structure containing a defect.

3ME12D301   **Rapid Prototyping and Tooling**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. make use of techniques for processing of CAD models for rapid prototyping,
2. apply fundamentals of rapid prototyping techniques,
3. decide appropriate tooling for rapid prototyping process,
4. extend rapid prototyping techniques for reverse engineering.

3ME12D302   **Finite Element Analysis**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. formulate the structural engineering and heat transfer problems into finite element model,
2. derive and solve the stiffness matrix, displacement matrix and load vectors for one/two dimension structural and heat transfer problems,
3. apply the finite element software to solve the structural engineering, heat transfer and manufacturing issues,
4. appraise the applications and limitations of FEA

3ME12D303   **Design of Machine Tools**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. decide general design requirements for commonly used machine tools,
2. design structural elements of   machine tools,
3. select the configuration of speed and feed regulation for various applications,
4. test the machine tools for alignment.

3ME12D304   **Tool Engineering**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. adapt design aspects for development of tools and dies for various manufacturing processes,
2. develop tooling for press work using appropriate software,
3. design and analyze the dies used in various metal forming processes,
4. make use of principles of Jig, fixture and gauge design.

3ME12D305   **Micro Electro Mechanical Systems**   **[3 0 0 3]**

Course Learning Outcomes (CLOs):

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

1. explain basics of MEMS devices,
2. apply knowledge of sensors and actuators while designing the new product,
3. select methods for surface micromachining for various materials.
4. evaluate the mechanics of MEMS devices.

3ME1302   **Major Project-Part-I**   **[0 0 0 14]**

Course Learning Outcomes (CLOs):

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

1. identify the issues related to the recent trends in the field of engineering and its applications,
2. formulate the problem definition, analyze and propose the solutions,
3. design, verify, test, and implement the solution,
4. compile and conclude the work carried out.

3ME1402   **Major Project-Part-II**   **[0 0 0 14]**

Course Learning Outcomes (CLOs):

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

1. identify the issues related to the recent trends in the field of engineering and its applications,
2. formulate the problem definition, analyze and propose the solutions,
3. design, verify, test, and implement the solution,
4. compile and conclude the work carried out.

3SS1201   **Research Methodology and IPR**   **[2 0 0 2]**

Course Learning Outcomes (CLOs):

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

1. formulate a research problem for a given engineering domain,
2. analyze the available literature for given research problem,
3. develop technical writing and presentation skills,
4. comprehend concepts related to patents, trademark and copyright.