

**Nirma University  
Institute of Technology  
School of Engineering  
Mechanical Engineering Department**

**M.Tech in Mechanical Engineering (CAD/CAM)**

**3ME1106                      Manufacturing Processes and Analysis                      [3 0 0 3]**

**Course Learning Outcome:**

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

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

**3ME1107                      Advanced Kinematics and Dynamics of Machines                      [3 0 2 5]**

**Course Learning Outcome:**

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

- principles of kinematic synthesis, analysis and dynamics to planer mechanisms.
- learn field balancing and dynamics of flexible rotors.
- Formulate the mathematical models of real life engineering systems for vibration study.
- Interpret the vibratory responses of multi degree of freedom systems and continuous system through experiments.

**3ME1108                      Advanced Machine Design I                      [3 1 0 4]**

**Course Learning Outcome:**

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

- apply design philosophies and knowledge of design.
- design various mechanical systems incorporating the effect of fatigue, creep and fracture mechanics.
- incorporate friction, wear and lubrication consideration in the design.
- design of tank and pressure vessel as per ASME and BIS standards.

**3ME1109                      Computer Aided Design                      [3 0 2 5]**

**Course Learning Outcome:**

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

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

## Semester II

**3ME1206                      Computer Aided Manufacturing                      [3 0 2 5]**

**Course Learning Outcome:**

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

- understand the basic principles of part programming for CNC machining
- select and apply appropriate operations, cutting parameters, cutting tools and software to machine a part
- create and optimize a part program using programming concepts for practical applications
- execute part program to produce quality part on CNC machine
- understand the components and design of FMS and CIM

**3ME1207                                      Finite Element Analysis                                      [3 0 2 5]**

**Course Learning Outcome:**

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

- Formulate the structural engineering, heat transfer problem into finite element model.
- Derive and solve the stiffness matrix, displacement matrix and load vectors for one / two dimensional structural and heat transfer problems.
- Apply the capabilities of finite element software to solve the structural engineering and heat transfer problems
- Interpret and evaluate the quality of results obtained using FE software.
- Appreciate the applications and limitations of finite element analysis

**3ME1211                                      Robotics and Manufacturing Automation                                      [4 0 0 4]**

**Course Learning Outcome:**

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

- understand different elements of a robotic system
- analyze the robotic system with respect to kinematics and dynamics
- develop programme to train robotic system
- conceptualize an automatic system for a manufacturing unit.

**3ME1212                                      Advanced Machine Design II                                      [3 0 0 3]**

**Course Learning Outcome:**

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

- design the components of overhead crane.
- design the thick cylinders subjected to external and internal pressure.
- formulate the optimization problems
- recognise the need of correction factor in gears.

**3SP1204                                      Research Methodology (Supplementary Course)                                      [0 1 0 0]**

**Course Learning Outcome:**

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

- appreciate the importance of literature survey and problem identification for formulating an effective research topic
- integrate the functionality of Mathematical modeling and Statistical analysis for understanding intricacies of the research work
- prepare research plan inclusive of experimental design
- communicate effectively with peer groups and technical diaspora using technical research papers and thesis or reports

**3SP1301**

**Practical Training (Supplementary Course)**

**[0 0 0 0]**

**Course Learning Outcome:**

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

- explore the preferred field of specialization and develop analytical / hardware / software / experimental skills
- manage the technical content and work
- prepare and present technical report

**3ME1301**

**Major Project Part I – Full Time**

**[0 0 0 15]**

**Course Learning Outcome**

The course provides an opportunity to the student to explore their knowledge in the area of their interest. Student will apply idea into application through experiments/ simulation. It will also help them to decide the project area / topic for further research work in their life. . As an outcome of the course, student will be able to develop:

- Problem formulation techniques.
- Analysis techniques of published data.
- Identification of scope and objectives of research work.
- Techniques for the design of experiments.
- Associated administration for project work.
- Development of compilation skill.
- Writing skill.
- Presentation skill.
- Technical Paper writing.
- Report preparation techniques.
- Fundamentals, information, reviews and in-depth knowledge in the desired area.

**3ME1401**

**Major Project Part II – Full Time**

**[0 0 0 15]**

**Course Learning Outcome**

The course provides an opportunity to the student to explore their knowledge in the area of their interest. Student will apply idea into application through experiments/ simulation. It will also help them to decide the project area / topic for further research work in their life. . As an outcome of the course, student will be able to develop:

- Problem formulation techniques.
- Analysis techniques of published data.
- Identification of scope and objectives of research work.
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