

## CAD & CAM

### B.Tech. III Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME3203PC	Core	3	0	0	3	25	75	100
		<b>Contact Classes: 52</b>				<b>Tutorial Classes: Nil</b>	<b>Practical Classes: Nil</b>	<b>Total Classes: 52</b>

#### I. COURSE OVERVIEW:

This course will provide an overview of how computers are being used in design, development of manufacturing plans and manufacture. It covers various concepts of CAD/CAM such as geometric modelling, NC control, NC part programming, group technology etc.

#### II. COURSE OBJECTIVES:

To provide an overview of how computers are being used in design, development of manufacturing plans and manufacture. To understand the need for integration of CAD and CAM.

#### III. COURSE OUTCOMES:

Understand geometric transformation techniques in CAD. Develop mathematical models to represent curves and surfaces. Model engineering components using solid modeling techniques. Develop programs for CNC to manufacture industrial components. To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

#### IV. COURSE SYLLABUS:

##### UNIT – I:

Fundamentals of CAD/ CAM, Application of computers for Design and Manufacturing, Benefits of CAD/ CAM - Computer peripherals for CAD/ CAM, Design workstation, Graphic terminal, CAD/ CAM software- definition of system software and application software, CAD/ CAM database and structure. **Geometric Modeling:** Wire frame modeling, wire frame entities, Interpolation and approximation of curves, Concept of parametric and non-parametric representation of curves, Curve fitting techniques, definitions of cubic spline, Bezier, and B-spline.

##### UNIT – II:

**Surface modeling:** Algebraic and geometric form, Parametric space of surface, Blending functions, parametrization of surface patch, Subdividing, Cylindrical surface, Ruled surface, Surface of revolution Spherical surface, Composite surface, Bezier surface. B-spline surface, Regenerative surface and pathological conditions.

**Solid Modelling:** Definition of cell composition and spatial occupancy enumeration, Sweep representation, Constructive solid geometry, Boundary representations.

##### UNIT – III:

**NC Control Production Systems:** Numerical control, Elements of NC system, NC part programming: Methods of NC part programming, manual part programming, Computer assisted part programming, Post Processor, Computerized part program, SPPL (A Simple Programming Language). CNC, DNC and Adaptive Control Systems.

#### **UNIT – IV:**

**Group Technology:** Part families, Parts classification and coding. Production flow analysis, Machinecell design.

**Computer aided process planning:** Difficulties in traditional process planning, Computer aided process planning: retrieval type and generative type, Machinability data systems.

**Computer aided manufacturing resource planning:** Material resource planning, inputs to MRP, MRP output records, Benefits of MRP, Enterprise resource planning, Capacity requirements planning.

#### **UNIT – V:**

**Flexible manufacturing system:** F.M.S equipment, FMS layouts, Analysis methods for FMS benefits of FMS.

**Computer aided quality control:** Automated inspection- Off-line, On-line, contact, Non-contact; Coordinate measuring machines, Machine vision.

**Computer Integrated Manufacturing:** CIM system, Benefits of CIM.

#### **TEXT BOOKS:**

1. CAD/CAM Concepts and Applications / Alavala / PHI
2. CAD/CAM Principles and Applications / P. N. Rao / Mc Graw Hill

#### **REFERENCE BOOKS:**

1. CAD/CAM/ Groover M.P/ Pearson
2. CAD/CAM/CIM/ Radhakrishnan and Subramanian / New Age