

## CAD/CAM

<b>Course code</b>	20ME4601C	<b>Year</b>	III	<b>Semester</b>	II
<b>Course category</b>	Professional Elective-II	<b>Branch</b>	ME	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	MCMT
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Evaluation</b>	70	<b>Total Marks</b>	100

**Course Outcomes:** At the end of the course students will be able to

CO	Statement	Skill	BTL	Units
CO1	Discuss application of Computer in design and Manufacturing	Understand, Communication	L2	1,2,3,4,5
CO2	Apply raster scan graphic systems and knowledge of geometric modeling in design	Apply, Communication	L3	1,2
CO3	Employ suitable CNC machines and part programming techniques for various applications	Apply, Communication	L3	3
CO4	Summarize the concepts of Group Technology, Computer Aided Quality Control, Flexible Manufacturing Systems and Computer Integrated Manufacturing	Apply, Communication	L3	4,5

**Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1		1					2		2	3	1
CO2	3	2	3		1					2		2	3	3
CO3	3		3		1					2		2	3	1
CO4	3				1					2		2	3	1

**Syllabus**

UNIT	Contents	Mapped CO
I	<b>INTRODUCTION:</b> Product cycle and CAD/CAM, applications and Benefits of CAD, Hardware in CAD: Design Workstation-Graphics Terminal-Input devices- output devices-Display devices- Flat panel Display-LCD, LED, Hard Copy Devices-Printers and Plotters, CPU, Secondary Storage, Image Generation Techniques. <b>RASTER SCAN GRAPHICS</b> -Line generation Algorithms-DDA, Bresenham's algorithm, Coordinate systems, 2D transformation of geometry, Homogeneous representation,3D transformations, Cohen Sutherland Line clipping Algorithm, Hidden surface removal- Back face detection algorithm, Depth buffer algorithms.	CO1 CO2
II	<b>GEOMETRIC MODELING:</b> Curve representation- Cubic, Bezier and B-spline curves parametric forms, Geometric Modeling of Surfaces: Basic surfaces entities, sweep surfaces, surface of revolution, Surface blending, Geometric Modeling of Solids: Solid entities, Boolean operations, B-rep, CSG <b>DRAFTING AND MODELING SYSTEMS:</b> Basic geometric commands, layers, display control commands, editing, dimensioning	CO1 CO2

<b>III</b>	<p><b>COMPUTER AIDED MANUFACTURING (CAM):</b> Basic Components of NC System, NC Procedure, NC motion control systems, problems with conventional NC, Direct Numerical control (DNC), Computer Numerical Control (CNC), Functions of CNC and DNC systems.</p> <p><b>CNC PART PROGRAMMING:</b> fundamentals, manual part programming and Computer Assisted Part Programming-APT</p>	<b>CO1 CO3</b>
<b>IV</b>	<p><b>GROUP TECHNOLOGY (GT):</b> Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning- Retrieval type and Generative type.</p> <p><b>COMPUTER AIDED QUALITY CONTROL (CAQC):</b> Coordinate Measuring Machine, Non-Contact Inspection and Machine Vision</p>	<b>CO1 CO4</b>
<b>V</b>	<p><b>FLEXIBLE MANUFACTURING SYSTEM (FMS):</b> Components of FMS, FMS equipment and control, FMS Layouts</p> <p><b>COMPUTER INTEGRATED MANUFACTURING SYSTEM (CIMS):</b> CIM Wheel, Elements of CIMS, CIMS benefits.</p>	<b>CO1 CO4</b>

### Learning Resource

**Text books:**

1. CAD / CAM A Zimmers & M.P.Groover/PE/PHI
2. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH

**Reference books**

1. CAD/CAM by P.N. Rao/TMH.
2. Automation, Production systems & Computer integrated Manufacturing/ Groover /P.E
3. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age
4. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
5. CAD/CAM: Concepts and Applications/Alavala/ PHI
6. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson.

**e- Resources & other digital material**

1. <https://nptel.ac.in/courses/112/102/112102101/>
2. <https://nptel.ac.in/courses/112/104/112104289/>
3. <https://nptel.ac.in/courses/112/104/112104188/>