CAD/CAM

Course Code	19ME4501C	Year	III	Semester	I
Course Category	Program Elective-I	Branch	ME	Course Type	Theory
Credits	3	L – T – P	3 – 0 – 0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		Levels
After successful completion of the course, the student will be able to		
CO1	Describe basic structure of CAD workstation and Graphic systems	L2
CO2	Apply the knowledge of geometric modeling	L3
CO3	Explain the features of CNC machines and part programming	L2
CO4	Discuss the concepts of Group Technology, CAQC, FMS and CIM.	L2

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	2	2	3		3	2		1	1			2	3	
CO2	1	2	3		3	2		1	1			2	3	3
CO3	1		3		3	2		1	1			2	3	
CO4	2				3	2		1	1			2	3	

Syllabus

Unit No.	Contents	Mapped COs
I	**INTRODUCTION:** 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. **RASTER SCAN GRAPHICS -**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
II	**GEOMETRIC MODELING**: 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 **DRAFTING AND MODELING SYSTEMS:** Basic geometric commands, layers, display control commands, editing, dimensioning	CO2
III	**COMPUTER AIDED MANUFACTURING (CAM):** 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	CO3

	systems. **CNC PART PROGRAMMING:** fundamentals, manual part programming and Computer Assisted Part Programming-APT	
IV	**GROUP TECHNOLOGY (GT):** Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning- Retrieval type and Generative type. **COMPUTER AIDED QUALITY CONTROL (CAQC):** Coordinate Measuring Machine, Non-Contact Inspection and Machine Vision	CO4
V	**FLEXIBLE MANUFACTURING SYSTEM (FMS):** Components of FMS, FMS equipment and control **COMPUTER INTEGRATED MANUFACTURING SYSTEM (CIMS):** CIM Wheel, Elements of CIMS, CIMS benefits.	CO4

Learning Recourse(s)

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/