

CAD/CAM

Course code		Year	IV	Semester	I
Course category	Professional Core	Branch	ME	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Manufacturing Processes, Machine tools
Continuous Internal Evaluation:	30	SemesterEnd Evaluation:	70	Total Marks:	100

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

CO's	Statement	Blooms Level
CO1	Explain the fundamentals of CAD, CAM, automation, product design process, and the role of computers in design and product development.	L2
CO2	Illustrate computer graphics concepts, geometric transformations, projections, and different modeling techniques such as wireframe, surface, and solid modeling.	L3
CO3	Apply curve representation methods and data exchange formats used in CAD systems for geometric modeling and product representation.	L3
CO4	Develop and interpret CNC part programs using manual part programming and APT language, and explain CNC machine tools, DNC, and adaptive control concepts.	L3
CO5	Analyze group technology and flexible manufacturing systems, including part classification, production flow analysis, FMS layout, equipment, tool management, and control systems.	L3

Contribution of Course outcomes towards the achievement of program outcomes & Strength of correlations (High :3, Medium:2, Low:1)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	-	2	-	-	-	-	-	1	2	1
CO2	3	2	2	1	3	-	-	-	-	-	1	3	1
CO3	3	2	2	1	3	-	-	-	-	-	1	2	1
CO4	3	2	3	1	3	-	-	-	1	1	1	3	2
CO5	2	2	2	1	2	1	-	1	1	2	1	2	3

Unit	Contents	CO
I	INTRODUCTION: Fundamentals of CAD, CAM, Automation, design process, Application of computers for design, Benefits of CAD, Product Design and CAD-Comparison, benefits of using CAD in product design and product development cycle. COMPUTER GRAPHICS: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections.	CO1
II	WIRE FRAME MODELING: Definition, advantages, dis-advantages, wire frame entities- analytic entities and synthetic entities. SURFACE MODELING: Definition, advantages, disadvantages, surface entities- analytic entities and synthetic entities. SOLID MODELING: Definition, constructive solid geometry, advantages, modelling entities. Curve representation: Implicit and explicit forms of straight line, circle, ellipse, cubic spline and Bezier curve, differences between Bezier curve and,	CO2

	cubic spline curve and Introduction to Data exchange formats. formats.	
III	PART PROGRAMMING: NC, NC modes, NC elements, CNC machine tools and their applications, Parts and power transmission in CNC machine tools, features of Machining center, turning center, CNC Part Programming: fundamentals, manual part programming methods, Computer Aided Part Programming- APT language, simple problems in manual part programming and Computer Aided Part Programming. Direct Numerical Control, Adaptive Control.	CO3
IV	GROUP TECHNOLOGY: Part family, coding and classification, Optiz and MICLASS classification system, benefits of group technology - production flow analysis, types and advantages. FMS: Introduction, types of FMS, Equipment, Tool management systems, Layouts, FMS Control.	CO4
V	COMPUTER INTEGRATED MANUFACTURING SYSTEMS: Types of manufacturing systems, machine tools and related equipment, material handling systems, material requirement planning, MRP, Enterprise resource planning, computer control systems, human labor in manufacturing systems, CIMS benefits, computer aided quality control, Computer aided processes planning – variant process planning and generative process planning-Implementation considerations.	CO5

Learning Resource

Text books:

TEXT BOOKS:

1. Automation, Production systems & Computer integrated Manufacturing/ M.P. Groover/Pearson Education
2. Mastering CAD / CAM / Ibrahim Zeid / McGraw-Hill

Reference books

1. CAD / CAM Principles and Applications/PN Rao / McGraw-Hill
2. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
3. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson learning, Inc
4. Product manufacturing and cost estimation using CAD/CAE/ Kuang Hua Chang/Elsevier Publishers

E-Resources & other digital Material:

- https://ocw.mit.edu/courses/16-810-engineering-design-and-rapid-prototyping-january-iap-2005/bc0d838ef78b9804aed4ae00bd58e4a2_14.pdf?utm
<https://nptel.ac.in/courses/110105155?utm>