

III Year II Semester

L T P C

Code: 20ME6320

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CAD/CAM

Course Objectives:

The Students will acquire the knowledge

1. To understand the basic fundamentals of computer aided design and manufacturing.
2. To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc
3. To understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication.
4. To learn the part programming, importance of group technology, computer aided process planning, computer aided quality control
5. To learn the overall configuration and elements of computer integrated manufacturing systems.

UNIT-I COMPUTERS IN INDUSTRIAL MANUFACTURING

Product cycle, CAD/CAM Hardware, basic structure, CPU, memory types, input devices, display devices, hard copy devices, storage devices.

COMPUTER GRAPHICS: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping, hidden surface removal.

UNIT-II GEOMETRIC MODELING

Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired. DRAFTING AND MODELING SYSTEMS: Basic geometric commands, layers, display control commands, editing, dimensioning, solid modelling.

UNIT-III PART PROGRAMMING FOR NC MACHINES

NC, NC modes, NC elements, CNC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming: fundamentals, manual part programming methods, Computer Aided Part Programming. Direct Numerical Control, Adaptive Control

UNIT-IV GROUP TECHNOLOGY

Part family, coding and classification, production flow analysis, types and advantages. Computer aided processes planning – importance, types. FMS - Introduction, Equipment, Tool management systems, Layouts, FMS Control.

UNIT-V COMPUTER AIDED QUALITY CONTROL

Terminology used in quality control, use of computers in Quality control. Inspection methods-contact and noncontact types, computer aided testing, integration of CAQC with CAD/CAM. COMPUTER INTEGRATED MANUFACTURING SYSTEMS: Types of manufacturing systems, machine tools and related equipment, material handling systems, material requirement

planning, computer control systems, human labor in manufacturing systems, CIMS benefits.

TEXT BOOKS:

1. CAD/CAM Principles and Applications / PN Rao / McGraw Hill
2. Automation, Production systems & Computer integrated Manufacturing / M.P.Groover / Pearson Education

REFERENCES:

1. Mastering CAD/CAM / Ibrahim Zeid / 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

Course Outcome:

At the end of the course the students shall be able to:

1. Understand the basic fundamentals of computers in industrial manufacturing and applications of computer graphics. (BL-2)
2. Interpret geometric modeling techniques and requirements.(BL-2)
3. Develop part programming for NC and CNC machines.(BL-3)
4. Illustrate the concepts of group technology and computer aided process planning for the product development.(BL-2)
5. Understand the concepts of computer aided quality control and Computer Integrated Manufacturing Systems. (BL-2)