4/4 B.Tech. SEVENTH SEMESTER

ME7T5B **CAD/CAM** **Credits: 4**

Lecture:- 4 periods/week - **Internal assessment: 30marks**
Tutorial : 1 periods/week **Semester end examination: 70 marks**

Objectives:

1. Acquire basic foundation in computer aided design / manufacturing
2. Recognize the fundamentals used to create and manipulate geometric models
3. Get acquainted with the computer graphics and CAD software for geometric modeling
4. Learn working principles of NC machines CNC control and part programming
5. Appraise concept of Group Technology, CAQ, FMS and CIM

Learning outcomes:

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

1. Upon completion of this course the student will be able to
2. Recognize Basic structure of CAD workstation, and acquire knowledge of Memory types, input/output devices display devices and computer graphics
3. Distinguish basic Geometric models, drafting and modeling system
4. Use fundamental and advanced features of CNC machines and Group Technology
5. Familiarize with concepts of CAQ, FMS and CIM

Pre-Requisites:

Mathematics, Production technology, Machine tools

UNIT – I

INTODUCTION:

Computers in design and Industrial Manufacturing, Product cycle, CAD / CAM Hardware, Basic structure, CPU, Memory types, input devices, display devices, hard copy devices, and storage devices.

UNIT – II

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 – III

GEOMETRIC MODELING:

Requirements, geometric models, curve representation methods, surface representation methods, solid modeling, and modeling facilities desired.

UNIT – IV

DRAFTING AND MODELING SYSTEMS:

Basic geometric commands, layers, display control commands, editing, dimensioning, solid modeling.

UNIT – V

NUMERICAL CONTROL IN PRODUCTION SYSTEMS:

components of NC systems, Classification of NC systems, Punched tape, Tape format, NC co-ord system, NC Applications, Advantages and disadvantages of NC machines. CNC concepts, Advantages of CNC, Direct numerical control, types, advantages, adaptive control machining

PART PROGRAMMING**:** Introduction, Manual part programming, codes &concepts, Simple programming examples. Advantages of Computer assisted part programming, APT language, Simple programming examples. Types of Computer Aided Process Planning. Retrieval – Type Process Planning Systems, Generative Process Planning Systems, Benefits of CAPP.

UNIT – VI

GROUP TECHNOLOGY:

Introduction, Part Families, Parts Classification and Coding,

Different Parts Classification and Coding Systems, Cellular Manufacturing, Composite Part Concept, Benefits of Group Technology. Computer aided quality control.

UNIT – VII

FLEXIBLE MANUFACTURING SYSTEMS:

Introduction, Types of FMS, FMS Layout Configurations, FMS Applications and Benefits. Introduction to Computer Integrated Manufacturing.

UNIT – VIII

COMPUTER INTEGRATED MANUFACTURING SYSTEMS:

Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

Learning resources

Text Book :

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

Reference Books :

1. Automation , Production systems & Computer integrated Manufacturing, ,(3ed Edition), Groover ,P. Publishing
2. CAD / CAM / CIM, (2nd Edition), by Radhakrishnan and Subramanian, "", New Age Publications,.
3. Principles of Computer Aided Design and Manufacturing, (2nd edition), by Farid Amirouche, Pearson publications,.
4. CAD/CAM: Concepts and Applications, (1st Edition), by Alavala, PHI publications,.
5. Computer Numerical Control Concepts and programming, (4th edition), by Warren S Seames Thomson, "" Thomson Learning. Publication,.

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