

SUBJECT TITLE : CAD & CAM
SUBJECT CODE : 5025
COURSE CATEGORY : E
PERIODS PER WEEK : 4
TOTAL PERIODS :72
CREDITS : 4

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Computer Aided design and Geometric modeling	17
	Test I	1
2	Computer Aided manufacturing	17
	Test II	1
3	CNC Machines	17
	Test III	1
4	CNC Components and Part Programming	17
	Test IV	1
	Total	72

OBJECTIVES

- Define CAD, list stages& benefits of CAD
- Explain CAD hardware and Software
- Appreciate the uses of computer networking
- Define CAM and list its functions
- Explain CAPP, its structure and types
- Describe concept of Rapid prototyping
- Differentiate between sequential engineering and concurrent engineering
- Compare NC,CNC,DNC
- Explain turning centers and machining centers
- Describe Coordinate measuring machines
- Explain spindle drive and slide ways
- Explain ATC
- Explain different feedback devices
- Prepare NC part programs using G code and M code
- Describe conversational programming and APT programming
- Explain the concept of Group technology, FMS and CIM

CONTENT OUTLINE

MODULE I

COMPUTER AIDED DESIGN AND GEOMETRIC MODELLING

Introduction - CAD definition – CAD activities – benefits of CAD- CAD hardware – Input/Output devices – CRT – raster scan & direct view storage tube – LCD, plasma panel, mouse, digitizer, image scanner, drum plotter, flat bed plotter, laser printer. Secondary storage devices – hard disk, floppy disk, CD, DVD, Flash memory Types of CAD system – PC based

CAD system, workstation based CAD system- graphics workstation – configuration and typical specification- CAD software packages computer networking – purposes, topology and types Geometric modeling techniques – wire frame , surface, solid modeling

MODULE II

COMPUTER AIDED MANUFACTURING

CAM definition – functions of CAM – benefits of CAM- integrated CAD/CAM organization – process planning – master data – structure of a typical CAPP .Types of CAPP – Variant type, generative type- advantages of CAPP – aggregate production planning – Master production schedule(MPS) – capacity planning,Guide lines of Design for Manufactiue/assembly.Product development cycle – sequential engineering – concurrent engineering –Rapid prototyping – concept and applications – 3D printing.

MODULE III

CNC MACHINES

Numerical control – definition – components of NC system – development of NC – DNC –CNC Adaptive Control Systems – working principle of a CNC system – distinguishing features of CNC Machines – advantages of CNC machines – difference between NC and CNC
Types of turning centers – horizontal – vertical .Types of machining centers – horizontal spindle – vertical spindle –universal machines – machine axis conventions.

MODULE IV

CNC COMPONENTS AND PART PROGRAMMING

Drives – spindle drive – hydraulic drive systems – direct current motors – stepping motors – servo motors. AC drive spindles – slide ways – linear motion bearing - recirculation ball screw – ATC – tool magazine. feedback devices - encoders – linear and rotary transducers – in-process probing .NC part programming – manual programming – sequence number – preparatory functions and G codes – miscellaneous functions and m codes –
CNC program procedure – coordinate system – types of motion control – point-to-point, paraxial and contouring- NC dimensioning . Reference points - machine zero – work zero – tool zero and tool offsets. Part program – tool information – speed – feed data – interpolation – macro subroutines – mirror images – thread cutting – sampler programs for lathe and milling – generating CNC codes from CAD models – post processing – conversational programming – APT programming.

TEXT BOOKS

1. CAD/CAM/CIM – R . Radhakrishnan , S, Subramanian, V. Raju – New Age International Pvt Ltd
2. CAD/CAM – Mikell P Groover - PHI Pvt Ltd

REFERENCES

1. Automation, Production systems and Computer Integrated Manufacturing – Mikell P Groover – Pearson Education Asia.
2. CAD/CAM Principles and Applications – Dr.P.N.Rao – Tata McGraw Hill