COURSE TITLE   : CAD/CAM
COURSE CODE   : 6024
COURSE CATEGORY   : E
PERIODS/ WEEK   :4
PERIODS/ SEMESTER   : 60
CREDIT   :4

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	CAD & Geometric modelling	15
2	Computer aided manufacturing	15
3	NC, DNC and CNC Machines	15
4	CNC components and part programmimg, CNC program procedure	15
	TOTAL	60

COURSE OUTCOME   :

sl.no.	sub	student will be able to
1	1	Understand the concept of computer aided design and geometric modelling.
	2	Comprehend the concept of Computer Aided Manufacturing.
	3	Understand the technology involved in NC, DNC and CNC systems.
	4	Comprehend the CNC components and part programming.

SPECIFIC OUTCOME

MODULE I

1.1.0   **Understand the concept of Computer Aided Design and Geometric modelling**.
1.1.1   Define CAD and CAD activities
1.1.2   List the benefits of CAD
1.1.3   List the 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.
1.1.4   Identify the Secondary storage devices - hard disk, floppy disk, CD, DVD, Flash memory
1.1.5   Classify the CAD system - PC based CAD system, workstation based CAD system
1.1.6   Illustrate the graphics workstation - configuration and typical specification
1.1.7   Explain the CAD software packages, computer networking - purposes,
1.1.8   Illustrate the topology and types of Geometric modeling techniques - wire frame , surface, solid modeling

MODULE II

2.1.0 Comprehend the concept of Computer Aided Manufacturing
2.1.1 Define CAM
2.1.2 State the functions and benefits of CAM
2.1.3 Explain the integrated CAD/CAM organization
2.1.4 Describe the Process planning - master date - structure of a typical CAPP.
2.1.5 Classify the CAPP - Variant type, generative type-
2.1.6 List the advantages of CAPP
2.1.7 Describe the aggregate production planning - Master production schedule(MPS) - capacity planning,
2.1.8 List the guidelines of design for manufacture/assembly.
2.1.9 Describe the Product development cycle - sequential engineering - concurrent engineering
2.1.10 Explain the Rapid prototyping and its concept and applications
2.1.11 Illustrate 3D printing.

MODULE III

3.1.0 Understand the technology involved in NC, DNC and CNC systems
3.1.1 Define Numerical control
3.1.2 List the components of NC system
3.1.3 Describe the features of NC - DNC –CNC- Adaptive Control Systems
3.1.4 State the working principle of a CNC system
3.1.5 Describe the features of CNC Machines
3.1.6 List the advantages of CNC machines
3.1.7 Differentiate between NC and CNC
3.1.8 Classify the turning centers
3.1.9 Illustrate the machining centers

MODULE IV

4.1.0 Comprehend the CNC components and part programming
4.1.1 List the different Drives
4.1.2 Explain the AC drive spindles, slide ways, linear motion bearing, recirculation ball screw, ATC and tool magazine.
4.1.3 Identify the feedback devices
4.1.4 Explain the concept of NC part programming
4.1.5 Describe the CNC program procedure
4.1.6 Define the coordinate system
4.1.7 Explain the types of motion control
4.1.8 Describe the NC dimensioning.
4.1.9 Define the Part program
4.1.10 Generate the sample programs for lathe and milling
4.1.11 Generate the CNC codes from CAD models
4.1.12 Define the post processing

CONTENT DETAILS

MODULE I

CAD - 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 - Identify Secondary storage devices - hard disk - floppy disk - CD - DVD - Flash memory - CAD system - PC based CAD system – workstation based CAD system - graphics workstation - configuration – specification - CAD software packages - computer networking – purposes - topology - Geometric modeling techniques - wire frame – surface - solid modeling.

MODULE II

Define CAM - functions - benefits - CAD/CAM - Process planning - master date – CAPP - structure - Classification - Variant - generative - advantages - production planning - Master production schedule(MPS) - capacity planning - Guide lines for Design of Manufacture/assembly - Product development cycle - sequential engineering - concurrent engineering - Rapid prototyping - concept - applications.

MODULE III

Numerical control – components –development of NC - DNC –CNC- Adaptive Control Systems – CNC - working principle –features –advantages – Differentiate NC and CNC - turning centers - Classification - horizontal - vertical - machining centers - horizontal spindle - vertical spindle -universal machines - machine axis conventions.

MODULE IV

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 - Mm codes
Coordinate system - types of motion control - point-to-point - paraxial and contouring- NC dimensioning. - Reference points - machine zero - work zero - tool zero - tool offsets - Part program - tool information - speed - feed data - interpolation - macro subroutines - mirror images – thread cutting – sample programs for lathe and milling – 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

REFERENCE

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