

## CAD/CAM

L T P  
4 - 4

### RATIONALE

CAD/CAM subject is very important these days and is extensively required in industry. This subject enables the students to learn about the applications of computer in design and manufacturing.

### DETAILED CONTENTS

#### Section – I CAD

1. Fundamentals of CAD (04 hrs)

Introduction, Design Process, Application of Computers in Design. Creating Manufacturing, Database, Automation, Difference between CAD/CAM and Automation. Coordinate systems, User coordinates, Working Coordinate System (WCS), User Coordinate System (UCS). Benefits of CAD

2. CAD HARDWARE (10 hrs)

**Input Devices:** Keyboard, Touch Panel, Light pens, Graphic tables, Joysticks, Trackball, Mouse, Voice System. **Output Devices :** Storage Tube, Graphics displays, Raster Refresh Graphic Displays, Plasma Panel Displays, Liquid Crystal Displays (LCD), Light Emitting Diodes (LED), Central Processing Unit (CPU)

3. CAD/CAM (10 hrs)

Geometrical Modelling, Data Structures, Database Management System (DBMS), Database coordinate System, Solid frame modelling and Wire frame modelling

4. GEOMETRICAL TRANSFORMATION (10 hrs)

Introduction to transformation, scaling, rotation and translation in 2D. Concatenation

#### Section – II CAM

5. FUNDAMENTAL OF CAM (10 hrs)

Introduction, Manufacturing line, Application of computers in manufacturing

6. NC MACHINE TOOLS (10 hrs)

Nomenclature NC Machine axis, Types of NC machine tools, Features of NC machine tools, NC Motion control System. Machine control Unit: Manual Control Panel, NC Actuation Systems, Part program to command

signal, MCU organization, Transducer for NC machine tools

7. COMPUTER CONTROL IN NC (10 hrs)

Problems with Conventional NC, Computer Numerical Control, Direct Numerical Control (DNC), Combined DNC/CNC Systems. ADAPTIVE CONTROL SYSTEM - their types, Advantages; Adaptive control for proper cutting speed, feed in turning operation

**PRACTICAL EXERCISE**

1. Introduction to AutoCAD: Setting up, practice on – how to create a new drawing file, setting drawing limits and saving a file, drawing lines in different ways using absolute coordinate system, user co-ordinates, WCS, UCS, drawing circles, drawing arcs, drawing ellipses. Drawing polygons, drawings splines. Drawing polylines, using window, zoom commands.
2. Practice on Edit commands such as erase, copy, mirror array, offset, rotate, oops, undo, redo, scale, stretch, trim, break, extend chamfer, fillet.
3. Practice on Text commands: editing text, text size, text styles, change properties commands.
4. Practice on Layer Commands: creating layer, freeze, layer on/off colour assigning, current layer, load line type, lock and unlock layer, move from one layer to other.
5. Practice on Hatching, Hatch pattern selection, practice on Dimensioning linear dimensioning, angular dimensioning radius/diameter dimensioning O-snap command, aligned dimensioning, editing of dimensioning, tolerance in dimensioning.
6. Practice on print /plot commands. Export/Import commands.
7. Practice on making complete drawings of components by doing following exercises:
  - a) Detail and assembly drawing of the following using AUTOCARD 2D (4 Sheets)
    - Plummer Block
    - Wall Bracket
    - Stepped pulley, V-belt pulley
    - Flanged coupling
    - Machine tool Holder (Three views)
    - Screw jack or knuckle joint
  - b) Isometric Drawing by CAD using Auto CAD (1 sheet)

- Drawings of following on computer
  - Cone
  - Cylinder
8. Modelling and Simulation of CAM Software
  9. Demonstration the CNC trainer.
  10. Practice on CNC trainer for various types of jobs.

### **INSTRUCTIONAL STRATEGY**

Before teaching this subject, it would be very helpful if teacher knows and give the knowledge to the students about basics of computer and mathematics and their application in engineering and technology

### **RECOMMENDED BOOKS**

1. CAD/CAM- Theory and practice by Zeiod libraham; Tata McGraw Hill
2. CAD/CAM by Groover And Zimmers; PHI
3. CNC Machine by Kundra Rao and Tiwari
4. CNC Machine by Pabla and Adithan; NITTTR, Chandigarh
5. Computer Graphics by Steven Harrington; Mc Graw Hill
6. Numerical Control of Machine Tools by Koren and Ben-Uri; Khanna Publisher

### **SUGGESTED DISTRIBUTION OF MARKS**

<b>Topic No.</b>	<b>Time Allotted (Hrs)</b>	<b>Marks Allotted (%)</b>
1	04	06
2	10	16
3	10	16
4	10	14
5	10	16
6	10	16
7	10	16
<b>Total</b>	<b>64</b>	<b>100</b>

