

Course Title	COMPUTER AIDED DESIGN
Course Code	MD113
Course Credit	Lecture : 03
	Practical : 01
	Tutorial : 00
	Total : 04

Course Objective

The objective of the course is to -

- Introduce the student to the language of graphics used in engineering and technology
- The student will learn how to adapt the principles of descriptive geometry when applied to "real-world" applications, involving using the CADD system to create Isometric and 3-D drawings, Assembly and animation
- Perform computer programming for design.

Detailed Syllabus

Sr. No.	Name of chapter & Details	Hours Allotted
SECTION - I		
1	Introduction: Introduction: Need and Scope of Computer Aided Design, Elements of CAD, Essential requirements of CAD, Concepts of integrated CAD/CAM, Necessity & its importance, Engineering Applications	02
2	Computer graphics:: Principles of interactive computer graphics and overview of hardware available for use in CAD Scan conversion, Graphics Functions, Output primitives- Bresenham's line drawing algorithm and Bresenham's circle generating algorithm, World/device Coordinate Representation, Windowing and clipping, 2 D Geometric transformations-Translation, Scaling, Shearing, Rotation & Reflection Matrix representation, Composite transformation, 3 D transformations	07
3	Geometric modelling:: Types of mathematical representation of curves, Wire frame models wire frame entities, Parametric representation of synthetic curves, Hermit cubic splines, Bezier curves, B-splines rational curves. Representations of B-rep and C-rep, Feature based modelling. Visual Realism	04
4	Surface modelling:: Mathematical representation surfaces, Surface model, Surface entities surface representation, Parametric representation of surfaces, plane surface, rule surface, surface of revolution, Tabulated Cylinder.	04

5	Geometric modelling-3D: Solid modeling, Solid Representation, Boundary Representation (B-rep)	04
	Total	21
SECTION – II		
6	Database Techniques: Data structure, Database management, Product data exchange, CAD standards, Graphics database design, user interface.	07
7	Design and Analysis: Parametric design and programming, Programming Levels, Macros, Animation and simulation, Mathematical modeling and methods of solution.	07
8	Computer aided design of machine components: To develop algorithms, flowcharts and computer programs using C, C++, MATLAB Programming language for the design of machine components such as shafts, springs, couplings, clutches, brakes, levers, gears, belts.	07
	Total	21

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.

Students Learning Outcomes:

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

- Understand basic mechanism behind CAD technology
- Model a drawing as per the industry expectation.
- Make a computer program to solve real industrial problem.

Reference Books:

1. CAD in Mechanical Engineering by V. Ramamurti - Tata McGraw Hill
2. CAD/CAM Theory & Practice by Ibrahim Zeid - McGraw Hill
3. Mathematical Elements for Computer Graphics by Rogers D.F. - McGraw Hill
4. Principles of CAD by J. Flooney and P. Steadman - Affiliated East West Press
5. Procedural Elements for Computer Graphics by Rogers and Adams - McGrawHill

Additional Resources

- www.nptel.iitm.ac.in