



FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Engineering

Semester I

Course Code: 102320102

Course Title: Computer Aided Design

Type of Course: Core Course II

Course Objectives: The course is intended to acquaint and equip with the 3D modelling techniques and applications of computers in designing the various Mechanical systems.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	40/16	20/08	60/24	30/12	150 / 60

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction Application of computers for design, Product Cycle and CAD-CAM Benefits, Conventional Design Vs CAD, Selection and evaluation of CAD/CAM system, input devices, output devices, display devices, technical specification of CAD workstation, computer software-operating system, files creation, data file processing, application software in CAD.	5
2	Principles of Computer Graphics Introduction, Scan conversions, DDA and Bresenhan's algorithm for generation of various figure, Clipping, Windows and View ports, graphic primitives, Plotting of analytical Curves, Coordinate systems, Half-Spaces and Homogeneous Coordinates, 2D and 3D Transformation, Standards in CAD, graphics and computing standards, data exchange standards.	10



3	Geometric Modelling Curves and Surfaces: Parametric representation of lines, Circle, Ellipse, Parabola and Hyperbola. Synthetic Curves: Concept of continuity, Cubic Spline, Bezier Curve, B-Splines and NURBS. Various types of surfaces along with their typical applications. Solid Modelling: Introduction, Solid Representation, Properties of Solid model, Regularized Boolean set operations, Primitive instancing, Sweep representations, Boundary representations (B-rep), Constructive Solid Geometry (CSG), Comparison of representations.	14
4	Advanced Design Approaches: Feature Based Modelling, Geometric tolerances and Mass Properties calculations, Assembly Modelling Approaches and its analysis, Reverse Engineering, Capabilities of various commercially available software in the area of CAD.	10
5	Click or tap here to enter text.	Click
6	Click or tap here to enter text.	Click
7	Click or tap here to enter text.	Click
8	Click or tap here to enter text.	Click
9	Click or tap here to enter text.	Click
10	Click or tap here to enter text.	Click
11	Click or tap here to enter text.	Click
12	Click or tap here to enter text.	Click
13	Click or tap here to enter text.	Click
14	Click or tap here to enter text.	Click
15	Click or tap here to enter text.	Click



Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
15	15	25	20	15	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	Mastering CAD / CAM, Ibrahim Zeid, McGraw-Hill.
2	Geometric Modelling, M Mortenson, Industrial Press.
3	CAD / CAM: Theory and Practice, Ibrahim Zeid, McGraw-Hill.
4	Mathematical Elements of Computer Graphics, David F Roger, McGraw Hill.
5	Computer Graphics: C Version, Hearn and Baker, Prentice Hall of India.
6	Curves and Surfaces for CAGD: A Practical Guide, Gerald Farin, Morgan Kaufmann.
7	Computer Graphics and Geometric Modelling, David Salomon, Springer.
8	Computer Aided Engineering Design, Anupam Saxena and Birendra Sahay, Springer.
9	Mechanical Assemblies: Their Design, Manufacture, and Role in Product Development, D E. Whitney Oxford Press.
10	Click or tap here to enter text.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Students will understand fundamentals of computer graphics and CAD data exchange.	35
CO-2	Students will learn various techniques for geometric modelling.	35
CO-3	Students will learn feature based modelling, estimation of mass properties and assembly modelling and analysis.	30
CO-4	Click or tap here to enter text.	Click
CO-5	Click or tap here to enter text.	Click
CO-6	Click or tap here to enter text.	Click
CO-7	Click or tap here to enter text.	Click
CO-8	Click or tap here to enter text.	Click
CO-9	Click or tap here to enter text.	Click
CO-10	Click or tap here to enter text.	Click



List of Practicals / Tutorials:

Click or tap here to enter text.

1	Introductory exercise for 3-D modelling
2	Exercise for 3D editing using CREO software
3	Exercise for advanced 3-D modelling using CREO software
4	To learn how to create drawing of a part using CREO Software
5	To learn basics of Assembly creation in CREO
6	Development of program for 2D line and circle generation using different algorithms
7	To Study the DIFFERENT file formats used in CAD system and preparing model
8	Parametric relationship, Surface property and Mass property calculation
9	Assembly Analysis for mechanism using CREO/Mechanism software
10	Development of program for CURVES using MATLAB Software
11	Click or tap here to enter text.
12	Click or tap here to enter text.
13	Click or tap here to enter text.
14	Click or tap here to enter text.
15	Click or tap here to enter text.

Supplementary learning Material:

1	Click or tap here to enter text.
2	Click or tap here to enter text.
3	Click or tap here to enter text.
4	Click or tap here to enter text.
5	Click or tap here to enter text.

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22