GUJARAT TECHNOLOGICAL UNIVERSITY

Mechanical Engineering/Production Engineering

B. E. SEMESTER: VI

Subject Name: **Computer Aided Design**
Subject Code: **161903**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	2	5	70	30	50

Sr. No.	Course Content	Total Hours
1.	**Fundamentals of Cad:** Introduction, Reasons for implementing a CAD system, Computer Aided Process application, conventional design vs CAD. Benefits, Hardware, CAD softwares, Elements of Programming, CAD programming. Technical specification of CAD workstation, computer software-operating system	03
2	**Computer Graphics:** Scan conversions, DDA and Breshnham's algorithm for generation of various figure, 2D and 3D transformations: Scaling, Translation, Rotation, Mirroring, Clipping, Homogeneous matrix.	04
3	**Geometrical Modeling:** Types & mathematical representation of curves, wire frame models, entities, representations, parametric representations	04
	3.1 Review of vector algebra, lines, circle, ellipse, parabolas, Parametric representation of synthetic curves, cubic curves, β - spline, Bezier spline, sweep curves,	05
	3.2 Surfaces & solids – model, entities, representations, fundamentals of surface and solid modeling, B-rep, constructive solid geometry (CSG), analytical modeling, sweep.	04
	3.3 Solid manipulation, visual realism. Computer aided design of Mechanical Elements & Mechanical Assembly with animation. Capabilities of various commercially available software in the area of CAD.	03
4	**Graphics Standards:** Standards for graphics programming, features of GKS, other graphics standards, PHIGS, IGES, PDES. Standards in CAD.	02

5	**Finite Element Analysis:** Types of elements, types of error, derivation equitation finite element procedure, Stress – deflection – stiffness matrix, global matrix, conductivity table.	04
	5.1 Elimination approach, penalty approach, effect of temperature, principle of min. Potential energy,	04
	5.2 Mesh generation, Capability of different FEA software.	02
6	**Optimization:** Introduction, design synthesis, Engineering vs Optimum Design, Objectives of Optimization, Classification of Optimization problems and their procedure, techniques of optimization, Optimized design of machine components, Optimization Software.	08

Text Books:

1. CAD/CAM: Computer Aided design and Manufacturing by Mikell Groover and Zimmer, Pearson Education
2. Computer Graphics - Hearn & Baker, PHI
3. Optimization Methods by S.S. Rao, New Age International Publications

Reference Books:

1. Computer Aided Engineering & Design by Jim Browne, New Age International Publications,
2. Computer Graphics & design by P. Radhakrishnan, C.P. Kothanadaraman, New age publication
3. Computer Aided Manufacturing by Tien Chien Chang, Richard, Wang Pearson Education
4. Computer Aided Analysis and Design of Machine Elements by Rao V. Dukkipati, M. Ananda Rao, Rama Bhat, New Age International Publications
5. Finite Element Analysis by Chendraupatla, EEE Publication.
6. Fundamentals of Computer Aided Design, by Vikram Sharma, KATSON educational series
7. Mathematical Elements for Computer Graphics - David F. Rogers & J. Alan Adams McGraw Hill
8. CAD / CAM - Chris McMohan, Jimmie Brown Addison - Wesley
9. CAD/CAM Theory & Practice by Ibrahim Zeid, Tata Mc Graw Hill
10. CAD/CAM/CAE by Chougule N K, Scitech Publications Pvt. Ltd.
11. Technology of CAD / CAM - Dr. Surendrakumar & Dr. A.K.Jha - Dhanpat Rai Sons
12. CAD/CAM: Computer Aided Design and Computer Aided Manufacturing by P K Jain, S Chand & Co.