

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 1

Mechanical Engineering (CAD/CAM)

Subject Name Computer Aided Machine Design

Sr.No	Course content
1.	Introduction: Need and Scope of Computer Aided Machine Design
2.	Computer graphics: Principles of interactive computer graphics and overview of hardware available for use in CAD; Scan conversion; Bresenham's Algorithm for line, circle, Geometric transformations- 2D and 3D translation, scaling, rotation, shear and reflection, homogeneous transformations
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 : B-rep and C-rep, Feature based modelling.
4	Surface modeling :Mathematical representation surfaces, Surface model, Surface entities surface representation, Parametric representation of surfaces, plane surface, rule surface, surface of revolution, Tabulated Cylinder.
5	Geometric modelling-3D: Solid modeling, Solid Representation, Boundary Representation (B-rep), Constructive Solid Geometry (CSG).
6	Solid modeling using software: Solid modeling of components and Assembly using CAD software such as ProEngineer/Inventor Professional / Mechanical Desktop
7	Computer aided design of machine components: To develop computer programs using 'C' / 'C++' / MATLAB Programming language for the machine components such as shafts, springs, couplings, clutches, brakes, levers, gears, belts
8	Engineering optimization: Optimum design of Machine Elements, Johnson's method, single variable and multi variable optimization techniques. Single objective and Multi-objective functions related to machine component design

REFERENCE BOOKS:

1. CAD/CAM Theory and Practice by Ibrahim Zeid & R.Sivasubramanian, Tata Mc Graw Hill international.
2. Geometric Modelling, Mortenson, M.E., John Wiley & Sons, NY, 1985.
3. David F. Rogers and J. Alan Adams, "Mathematical Elements for Computer Graphics", McGraw-Hill.
4. Mastering CAD/CAM / Ibrahim Zeid / Mc Graw Hill international. CAD/CAM / P.N. Rao / TMH.
5. Engineering Optimization by S.S.Rao.
6. Engineering Optimization by Kalyanmoy Deb.
7. Design of Machine Elements by C.S. Sharma & Kamlesh Purohit, PHI Publications.