GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: III

Mechanical Engineering (CAD/CAM)

Subject Name **Engineering Optimization**

Sr.No	Course content
1.	General Characteristics of mechanical elements, adequate and optimum design, principles of optimization, formulation of objective function, design constraints, classification of optimization problems. Single and multivariable optimization techniques.
2.	Technique of unconstrained minimization. Golden section, Random, Pattern and Gradient search methods, interpolation methods, equality and inequality constraints.
3.	Direct methods and indirect methods using penalty function, Lagrange multipliers. Geometric programming and stochastic programming, Genetic algorithms.
4	Engineering applications, structural-design application axial and transverse loaded members for minimum cost, minimum weight. Design of shafts, bars, columns and torsion members, design optimization of springs, gears.
5	Use of MATLAB optimization toolbox for the solution of problem on hand.

Reference Books:

1. Singeresu S. Rao, "Engineering Optimization -Theory and Practice" New Age.
2. Johnson Ray C., "Optimum Design of Mechanical elements" Wiley, John & Sons.
3. Goldberg D. E., "Genetic Algorithms in search, Optimization and Machine", Addison- Wesley – New York.
4. Kalyanamoy Deb, "Optimization for Engineering Design Algorithms and Examples" Prentice Hall of India.