GUJARAT TECHNOLOGICAL UNIVERSITY
M.E. Semester: III
Mechanical Engineering (CAD/CAM)

Subject Name   **Soft Computing Methods**

Sr.No	Course content
1.	**SOFT COMPUTING:** Neural Networks, Genetic Algorithm, Fuzz Logic, Neuro-Fuzzy system, Neural - Fuzzy system, Fuzzy Neural Networks, Fuzzy Genetic Algorithms, Neuro-Genetic Systems. Negotiations – Methods, Game theory, Plan based negotiations, Human based negotiations, privacy and security, deception. Software agents and their application in negotiation – Electronic Commerce, Kasbah. Look at Communication Theme
2.	**MATLAB BASICS:** MATLAB getting started, Working with matrices, plotting graphs, 2D plotter, 3D plots, 3D mesh plots, MATLAB programming, Control flow, example for Gauss Elimination method, Function Workspace
3.	**GENETIC ALGORITHM:** History, Natural Selection, Simulated Evolution, G.A. Vocabulary, Canonical GA – Concepts, Basic Principle, working principle, coding, fitness function, GA operators, Crossover, Mutation, Illustration, GAS and Traditional methods, exploitation and exploration, population based search, Applications o0f GA
4	**FUZZY SYSTEMS:** Motivation, Types of uncertainties, fussy sets, and fuzzy variables, fuzzy set basic concepts, fuzzy operations, fuzzy numbers
5	**NEURAL NETWORKS:** Functioning of human brains, classification of learning rules, basic learning laws, transfer functions, topology – hope field- ,neural network – its mathematical modeling, storage capacity – its application - pattern recognition, traveling sales person problem, formulation into optimization problem, multilayer neural network, radial basis function network, comparison between RBF networks and multilayer perceptions, interpolation problems.Supervised learning as an ill posed hyper surface reconstruction problem. Regularization theory and networks, Generalized radial basis function network, weighted norm, approximation properties of RBF networks, learning strategies – Fixed centers selected at random, Self organized selection of centers, image processing and its applications

Reference Books:

1. Soft Computing with MATLAB, 7th – 12th Jan. 2002, Dept. of Applied Mathematics, Faculty of Technology & Engg., MS.V Baroda.
2. Neuro – Fuzzy and Soft Computing -A computational Approach to learning and Machine Intelligence by J.S.R Jang, C.T. Sun, E.Mizutam, Pearson Education