

Gujarat Technological University

M.E. – Computer Engineering (Software Engineering (02))

3720217 – Soft Computing (Semester – II)

SYLLABUS

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	2	4	70	30	30	20	150

PREREQUISITE: Basic Knowledge of Mathematics

RATIONALE: To introduce the soft computing concepts and techniques and to foster their abilities in designing appropriate technique for a given scenario. To implement soft computing based solutions for real world problems. To give students knowledge about non-traditional techniques and fundamentals of artificial neural networks, fuzzy logic and genetic algorithms. To provide students hands-on experience on MATLAB to implement various strategies.

TERM DURATION: 20/01/2020 TO 20/05/2010 (17 WEEKS)

#	Description	#Lect	Wetg
1	INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS: Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics	7	14%
2	FUZZY LOGIC: Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.	9	20%
3	NEURAL NETWORKS: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks : Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks	10	20%

4	GENETIC ALGORITHMS: Goals of optimization, Comparison with traditional methods, schemata, Terminology in GA - String, Structure, Parameter string, data structures, operators, coding, fitness function, algorithm, Applications of GA in Machine Learning: Machine Learning Approach to Knowledge Acquisition.	9	20%
5	Matlab/Python Lib: Introduction to Matlab/Python, Arrays and array operations, Functions and Files, Study of neural network toolbox and fuzzy logic toolbox, Simple implementation of Artificial Neural Network and Fuzzy Logic	10	20%
6	Recent Trends in various classifiers, neural networks and genetic algorithm.	3	06%

Course Outcome:

Sr. No.	CO Statement	Weightage (%)
C01	Identify and describe soft computing techniques and their roles in building intelligent machines.	20
C02	Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.	20
C03	Apply genetic algorithms to combinatorial optimization problems.	20
C04	Evaluate and compare solutions by various soft computing approaches for a given problem.	20
C05	Use various tools to solve soft computing problems.	20