SCHEME OF COURSE WORK

Course Details:

Course Title	**: Soft Computing**		
Course Code	**:15IT2106**	**L P C**	**:3 0 3**
Program:	**: M.Tech**		
Specialization:	**: Software Engineering**		
Semester	**:I**		
Prerequisites	**:Nil**		
Courses to which it is a prerequisite	**:Nil**		

Course Outcomes (COs):

1	Explain soft computing techniques, artificial intelligence system
2	Differentiate ANN and human brain.
3	Analyse perceptron learning algorithms
4	Compare fuzzy and crisp logic systems
5	Discuss genetic algorithms

Program Outcomes (POs):

A post graduate software engineering will be able to

1	Ability to plan and execute software project modules, testing and delivery mechanisms.
2	Ability to use industry ready modern technologies through advanced data structures, expertise in web technologies.
3	Ability to think critically on the software related issues to provide viable solutions..
4	Ability to solve software related problems effectively and efficiently
5	Ability to conduct research on up-coming fields of software development and to innovate into new directions .
6	Ability to work as a effective team member in a collaborative and multidisciplinary works to create new computing mechanisms
7	Ability to manage a software team and to maintain financial records as per standards.
8	Ability to effectively communicate with clients, peers and society at large. .
9	Ability to take up lifelong learning to be in tune with the new software related technologies.
10	Ability to follow ethical practices in the software industry and accept social responsibility.
11	Ability to learn independently from mistakes and surge forwards with positive attitude.

Course Outcome Versus **Program Outcomes:**

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO-1	M		S	S	S	S			S		S
CO-2			M	M	S	S			M		M
CO-3			M	M	S	S			M		M
CO-4			M	M	S	S			M		M
CO-5			M	M	S	S			M		M

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing	CO-1	Explain differences between soft computing and hard computing.	▫ Lecture	Assignment (Week 2 - 4)
2	Introduction, Various types of production systems, characteristics of production systems, breadth first search, depth first search techniques, other Search Techniques like hill Climbing	CO-1	Explain various production systems.	▫ Lecture / Discussion	Mid-Test 1 (Week 9)
3	Best first Search, A* algorithm, AO* Algorithms and various types of control strategies. Knowledge representation issues, Prepositional and predicate logic	CO-1	Write about Prepositional and predicate logic.	▫ Lecture / Discussion	
4	monotonic and non monotonic reasoning, forward Reasoning, backward reasoning, Weak & Strong Slot & filler structures, NLP.	CO-1	Write about monotonic and non monotonic reasoning.	▫ Lecture	
5	Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN	CO-2	Explain about biological neuron and artificial neuron.	▫ Lecture	
6	Taxonomy of neural net, Difference b/w ANN and human brain, characteristic and applications of ANN, single layer network	CO-2	Write about single layer network.	▫ Lecture	
7	Perceptron training algorithm, Linear separability , Widrow & Hebb's learning rule/Delta rule, ADALINE, MADALINE, AI v/s ANN	CO-3	Explain perceptron training algorithm.	▫ Lecture	
8	Introduction of MLP, different activation functions, Error ,back propagation algorithm, derivation of BBPA, momentum, limitation, characteristics and application of EBPA.	CO-3	Explain back propagation algorithm.	▫ Lecture	
9	**Mid-Test 1**				
10	architecture , functioning & characteristics of counter Propagation network, Hop field/ Recurrent network, configuration, stability constraints, associative memory, and characteristics, limitations and applications	CO-3	Explain functioning & characteristics of counter Propagation network.	▫ Lecture ▫ Discussion	Mid-Test 2 (Week 18)
11	Hopfield v/s Boltzman machine. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Associative Memory.	CO-3	Expain adaptive Resonance Theory	▫ Lecture	
12	Fuzzy set theory, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Fuzzy systems: crisp logic, fuzzy logic, introduction & features of membership functions	CO-4	Write about crisp relation & fuzzy relations	▫ Lecture	
13	Fuzzy propositions, formation, decomposition & aggregation of fuzzy Rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making	CO-4	Write about fuzzy reasoning, fuzzy inference systems	▫ Lecture	

	& Applications of fuzzy logic.				
14	Fundamental, basic concepts, working principle, encoding, fitness function, reproduction.	CO-4	Write about encoding, fitness function.	▫ Lecture	
15	Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator ,Generational Cycle, Convergence of GA.	CO-5	Expain generational Cycle, Convergence of GA.	▫ Lecture	
16	Applications & advances in GA.	CO-5		▫ Lecture	
17	Differences & similarities between GA & other traditional methods.	CO-5	Expain hybrid systems.	▫ Lecture	
18	**Mid-Test 2**				
19/20	**END EXAM**				