ITE1015	Soft Computing	L	T	P	J	C
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Pre-requisite	**MAT2001**	**Syllabus version**				
		1.0				

Course Objectives:

- To introduce the fundamental concepts behind soft computing techniques.
- To explain the various architectures and algorithms of neural networks.
- To explore the fuzzy sets, fuzzy logic, rough sets and genetic algorithms.

Expected Course Outcome:

1) Identify the essential components of soft computing.
2) Describe and recognize the various types of memory models associated with neural networks.
3) Demonstrate various unsupervised learning techniques.
4) Examine the fundamentals of fuzzy sets and operations associated with them .
5) Establish fuzzy rules for decision making in real-time scenarios.
6) Investigate the idea behind rough sets.
7) Investigate the idea behind searching strategies.
8) Determine and construct a soft computing system required to address a computational task.

Student Learning Outcomes (SLO):	**1, 2, 7**

[1] Having an ability to apply knowledge of mathematics, science, and engineering
[2] Having a clear understanding of the subject related concepts and of contemporary issues
[7] Having computational thinking

Module:1	**Neural networks:**	**7 hours**

Introduction to Soft computing, basics. Neural networks, introduction, evolution, basic models, terminologies of ANN, Pitts model, Perceptron, Adaline, Back-propagation network, RBF network.

Module:2	**Memory Models:**	**5 hours**

Pattern association, auto & hetero associative memory models, BAM, Hopfiled network.

Module:3	**Unsupervised Networks:**	**6 hours**

Self-organizing maps, LVQ network, ART network.

Module:4	**Fuzzy sets:**	**6 hours**

Introduction, fuzzy sets, operations, fuzzy relations, membership functions, fuzzification & defuzzification.

Module:5	**Fuzzy logic and approximate reasoning:**	**7 hours**
Fuzzy truth values, fuzzy propositions, fuzzy rules, formation, decomposition and aggregation of rules, fuzzy reasoning, FIS, Fuzzy Decision Making.		
Module:6	**Rough Sets:**	**5 hours**
Information & decision systems, indiscernability, set approximations, properties of rough sets, rough memberships, reducts, and approximations.		
Module:7	**Search Strategies:**	**6 hours**
Genetic algorithms, hybrid systems.		
Module:8	**Contemporary issues:**	**3 hours**
	Total Lecture hours:	**45 hours**

Text Book(s)	
1.	Sivanandam, Deepa, Principles of Soft Computing, Second Edition, Wiley India, 2011.
Reference Books	
1.	Samir Roy and Udit Chakraborty, Introduction to Soft Computing, Pearson Education, 2013.
2.	T.J. Ross, Fuzzy logic with Engineering Applications, Third Edition, Wiley India, 2010.
3.	Laurene Fausett, Fundamentals of Neural networks: architectures, algorithms and applications, Pearson India, 2008.

Recommended by Board of Studies	05-03-2016		
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