Course Code	Course Title	L	T	P	C
BITE405L	Soft Computing	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			

Course Objectives:

1. To provide a basic understanding soft computing and its associated computational techniques
2. To facilitate real-world problem solving using soft computing approach
3. To introduce evolutionary computing and its applications

Course Outcomes:

1. Analyze various real-time problems and decide an appropriate soft computing technique
2. Apply Artificial Neural Networks for the classification/prediction in many real-world applications
3. Formulate problem-solving ideas with various soft computing tools (such as fuzzy sets and rough sets)
4. Summarize analyse the evolutionary computing tools for real-world problem solving
5. Involve in independent study and show your team-spirit in solving a real-world application of your choice and present your proposal as a solution to the application considered.

Module:1	Artificial Neural networks	8 hours

Introduction to Soft computing Artificial Neural networks: Introduction, Evolution & Classification, Terminologies - Basic Models - McCulloh Pitts neuron, Hebb network - Supervised Neural networks: Perceptron, Back-propagation network

Module:2	Memory Models	6 hours

Associative Memory networks: Introduction, Auto Associative Memory Model - Hetero Associative Memory Models, Bidirectional Associative Memory Model

Module:3	Unsupervised neural networks	6 hours

Kohenen Self-organizing Maps - LVQ Network - ART Network

Module:4	Fuzzy Sets & Relations	6 hours

Introduction to fuzzy systems - Classical Sets and Fuzzy Sets - Classical Relations & Fuzzy Relations, Membership Function Development – Fuzzification & Defuzzification

Module:5	Fuzzy Rule-based Systems	6 hours

Introduction to fuzzy logic - Linguistic Variables and Hedges - Rule-Based System – Fuzzy Propositions – Fuzzy Rules – FIS - Fuzzy Decision Making

Module:6	Rough Sets	5 hours

Fundamentals - Rough Approximations and Properties - Measures of Accuracy - Topological Characterization of Imprecision - Rough Membership Functions - Attribute

Reduction - Knowledge Representation Systems - Decision Tables - Rule Induction - Indiscernibility		
Module:7	**Evolutionary Computing**	**6 hours**
Genetic algorithm: Introduction - General GA – Operators - Problem Solving - Maximization Particle swarm optimization: Introduction – Implementation - Applications of Evolutionary Computing		
Module:8	**Contemporary Issues**	**2 hours**
	Total Lecture hours:	**45 hours**

Text Books	
1.	S.N. Sivanandam, S.N. Deepa, Principles of Soft Computing, 2019, 3rd edition, Wiley India.
2.	Timothy J. Ross, Fuzzy logic with Engineering Applications, 2016, 4th Edition, Wiley India.
Reference Book	
1.	B. K. Tripathy & J. Anuradha, Soft Computing: Advances and Applications, 2015, Cengage Learning India Pvt. Ltd., India.

Mode of Evaluation: Continuous Assessment Tests, Assignment, Quiz, Final Assessment Test			
Recommended by Board of Studies		12-10-2022	
Approved by Academic Council	No. 68	Date	19-12-2022