SOFT COMPUTING LABORATORY

II Semester: CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BCSC23	Core	0	0	4	2	30	70	100
Contact Classes: Nil	Total Tutorials: Nil	Total Practical Classes: 36				Total Classes: 36		

I. COURSE OVERVIEW:

This course focuses on tools such as Fuzzy Computing, Neuro-Computing, Evolutionary Computing, Probabilistic Computing, and Immunological Computing. The main objective of the proposed virtual lab is to introduce students about the latest Computational Intelligence Tools. The training of these tools will be useful to develop rigorous applications in the engineering domain.

II. COURSE OBJECTIVES:

The students will try to learn**:**

1. The fundamental Fuzzy concepts.
2. The Neural networks with back propagation and without propagation.
3. The operators of genetic algorithms.
4. The various crisp partitions.

III. COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1	**Develop** an ANN model with or without backpropagation	Apply
CO 2	**Show** fuzzy relations on fuzzy relations to handle uncertainty and solve engineering problems	Understand
CO 3	**Apply** genetic algorithms to combinatorial optimization problems	Apply
CO 4	**Use** the ANOVA model for analyzing the covariance of data	Apply
CO 5	**Solve** real problems using a soft computing approach	Apply

IV. SYLLABUS

Week-1: PERCEPTRON

Create a perceptron with appropriate number of inputs and outputs. Train it using fixed increment learning algorithm until no change in weights is required. Output the final weights

Week-2: ARTIFICIAL NEAURAL NETWORKS

A. Write a program to implement artificial neural network without back propagation.
B. Write a program to implement artificial neural network with back propagation.

Week-3: FUZZY SETS

Implement Union, Intersection, Complement and Difference operations on fuzzy sets. Also create fuzzy relation by Cartesian product of any two fuzzy sets and perform max-min composition on any two fuzzy relations.

Week-4: GENETIC ALGORITHMS

Implement travelling sales person problem (TSP) using genetic algorithms.

Week-5: COVARIANCE

Plot the correlation plot on dataset and visualize giving an overview of relationships among data on

soya bins data. Analysis of covariance: variance (ANOVA), if data have categorical variables on iris data.

Week-6: DATA FITTING BY REGRESSION
Implement linear regression and multi-regression for a set of data points.

Week-7: CRISP MODEL
Implement crisp partitions for real-life iris dataset.

Week-8: PERCEPTRON RULE
Write a program to implement Hebb's rule

Week-9: LOGIC GATES
Write a program to implement logic gates.

Week-10: ARTIFICIAL NEAURAL NETWORKS
Write a program to implement artificial neural network with back propagation.

Week-11: CLASSIFICATION
Implement SVM classification by Fuzzy concepts

Week-12: PERCEPTRON RULE
Write a program to implement Delta rule.

V. REFERENCE BOOKS:
1. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", Mc Graw Hill, 3rd Edition,1997.

VI. Web References:
https://www.books.google.co.in/books?id=bVbj9nhvHd4C