Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-701(C)	Soft Computing	PEC	3	2	1	0	50	100	150

Course Outcomes:

At the end of the course the students will be able to:	
CO1	Identify intelligent systems leveraging the paradigm of soft computing techniques.
CO2	Analyze the various neural network architectures.
CO3	Design the methodology to solve optimization problems using fuzzy logic.
CO4	Develop the knowledge of genetic algorithm concepts and their applications.
CO5	Evaluate the hybrid system to revise the principles of soft computing in various applications

Detailed Syllabus

Section A

Unit 1: Introduction: What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing. (8 Hrs.)

Unit 2: Artificial Neural Networks: - Basic concepts: Single Layer Perceptron, Multilayer Perceptron, Supervised and unsupervised learning, Back propagation, Networks-Kohen's self-organizing networks, Hopfield network, Feed forward network, Hopfield network. Neural Networks: Neural network models, layers in neural networks and their connections. Instar, Outstar, Weights on connections, Threshold function, Application: Adaline and Madaline. **(6 Hrs.)**

Unit 3: Fuzzy Systems: Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification. **(12 Hrs.)**

Section B

Unit 4: Genetic Algorithm: History of Genetic Algorithms (GA), Working Principle, Various Encoding methods, Fitness function, GA Operators- Reproduction, Crossover, Mutation, Convergence of GA, Bit wise operation in GA, Multi-level Optimization. **(8 Hrs.**)

Unit 5: Hybrid Systems: Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems. **(10 Hrs.)**

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Principles of Soft Computing	S.N.Sivanandam and S.N.Deepa	Wiley	3rd (2018)
2	Fuzzy Logic with Engineering Applications	Timothy J. Ross	Wiley	3rd (2011)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Soft Computing & Intelligent Systems: Theory & Applications	N. K. Sinha, M. M. Gupta	Academic Press /Elsevier	1st (2009)
2	Fuzzy Logic and Genetic Algorithms: Synthesis & Applications	S.Rajasekaran, G. A. Vijayalakshmi	PHI	1st (2013)