

Soft Computing Techniques

CourseCode	23EC4701D	Year	IV	Semester	I
Course Category	PE-IV	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	-
ContinuousInternal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		BL
CO1	Explain soft computing fundamentals including AI, neural networks, fuzzy logic, genetic algorithms, and swarm intelligence.	L2
CO2	Apply Perceptron, Back propagation, and Hopfield networks for classification and pattern recognition tasks.	L3
CO3	Analyse and construct fuzzy inference systems for real-world control.	L4
CO4	Use Genetic Algorithms and Evolutionary Programming to assess optimization challenges.	L4
CO5	Implement Ant Colony Optimization and Particle Swarm Optimization to solve engineering challenges	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2				1				1	1	2		1
CO2	3	3	2	1	1				1	1	2		1
CO3	3	3	2	1	1				2	1			
CO4	3	3	2	1	1				2	1			
CO5	3	2	2	1	1				2	1	1	2	2
Avg.	3	3	2	1	1				2	1	2	2	1

Syllabus		
UnitNo.	Contents	Mapped CO
1	Introduction to soft computing: Introduction, Artificial Intelligence, Artificial Neural Networks, Fuzzy systems, Genetic Algorithm and Evolutionary programming, Swarm Intelligent systems, Expert systems, Comparison among Intelligent systems.	CO1
2	Artificial Neural Networks: Introduction to Artificial Neural Networks, Classification of ANNS, First generation neural networks, Perceptron network, Adaline, Madaline, Second generation neural networks, Back propagation neural networks, Hopfield Neural Network, Kohonen neural network, Hamming neural network, Radial basis function neural networks, spike neuron models.	CO2
3	Fuzzy Logic System: Introduction to fuzzy logic, classical sets and fuzzy sets, fuzzy set operations, fuzzy relations, fuzzy composition, natural language and fuzzy interpretations, fuzzy inference system, fuzzy controllers	CO3
4	Genetic Algorithm: Introduction to Genetic algorithms, Genetic algorithms, procedures of Gas, working of Gas, Travelling salesman problem, Evolutionary programming, working principle of GA Machine learning classifier system	CO4

5	Swarm Intelligent system Introduction to swarm intelligence, back ground, Ant colony system, working of ant colony optimization, Particle swarm intelligent systems, Artificial bee colony system, cuckoo search algorithm.	CO5
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Learning Resources

Text Books

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| <ol style="list-style-type: none"> 1. N.P.Padhy, S.P.Simon, Soft computing with MATLAB programming—Oxford University Press, 2015 2. Kosko, B. Neural Networks and Fuzzy Systems , Prentice-Hall of India Pvt. Ltd., 1994. 3. Jacek.M.Zurada, Introduction to Artificial Neural Systems- Jaico Publishing House, 1999 |
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Reference Books

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| <ol style="list-style-type: none"> 1. Klir G.J. & Folger T.A., Fuzzy Sets, Uncertainty and Information - Prentice-Hall of India Pvt. Ltd., 1993. 2. Zimmerman H.J. Fuzzy Set Theory and Its Applications - Kluwer Academic Publishers, 1994. 3. Driankov, Hellendroon, Introduction to Fuzzy Control, Springer, 1993. 4. Dr. B. Yagananarayana, Artificial Neural Networks, PHI, New Delhi, 1999. |
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e- Resources & other digital material

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| <ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/106105173 2. http://elearn.psgcas.ac.in/nptel/courses/video/106105173/L13.html |
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