



Autonomous (2016-17)

Malad Kandivli Education Society's

NAGINDAS KHANDWALA COLLEGE

OF COMMERCE, ARTS & MANAGEMENT STUDIES

AND SHANTABEN NAGINDAS KHANDWALA COLLEGE OF SCIENCE

(Re-accredited (3rd cycle) by NAAC with 'A' Grade)

ISO 9001 : 2015 Certified

Educational Excellence Award By Indus Foundation, U.S.A.

IMC Ramkrishna Bajaj National Quality Commendation Certificate

New Courses introduced

2017-18 to 2020-21

**DR. (MRS.) ANCY JOSE
PRINCIPAL**

Core 4: Soft Computing

Course Objectives:

1. To introduce students to the basic concepts and techniques of soft computing.
2. Identify and describe soft computing techniques
3. Understand soft computing approaches in problem solving
4. Formulate real-world methodologies to data mining using soft computing tools

Learning Outcome:

After successful completion of course, Learners will be able to:

CO1: Differentiate between soft and hard computing (Level: Understand)

CO2: Implement artificial neural networks and fuzzy logic (Level: Apply)

CO3: Implement supervised and unsupervised learning networks (Level: Apply)

CO4: Demonstrate the suitable soft computing strategy to solve a given problem (Level: Analyse and Apply)

CO5: Demonstrate the advantages and drawbacks of soft computing strategies in problem solving (Level: Analyse and Evaluate)

CO6: Model complex problems using evolutionary algorithms and other soft computing models and compare the performance (Level: Create and Evaluate)

Sr. No.	Modules / Units
1	UNIT 1 Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Classification, Clustering, Bayesian Networks, Probabilistic reasoning, applications of soft computing.
2	UNIT 2 Artificial Neural Network: Fundamental concept, Evolution of Neural Networks, Basic Models, McCulloch-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neurons, Back propagation Network, Radial Basis Function, Time Delay Network, Functional Link Networks, Tree Neural Network. Associative Memory Networks: Autoassociative memory network, hetroassociative memory network
3	UNIT 3 UnSupervised Learning Networks: Fixed weight competitive nets, Kohonen self-organizing feature maps, learning vectors quantization, counter propagation networks, adaptive resonance theory networks. Special Networks: Simulated annealing, Boltzman machine, Gaussian Machine, Cauchy Machine, Probabilistic neural net, cascade correlation network, cognition network, neo-cognition network, cellular neural network, optical neural network

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4	UNIT 4
	<p>Introduction to Fuzzy Logic, Classical Sets and Fuzzy sets: Classical sets, Fuzzy sets.</p> <p>Classical Relations and Fuzzy Relations: Cartesian Product of relation, classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets.</p> <p>Membership Function: features of the membership functions, fuzzification, methods of membership value assignments.</p> <p>Defuzzification: Lambda-cuts for fuzzy sets, Lambda-cuts for fuzzy relations, Defuzzification methods.</p> <p>Fuzzy Arithmetic and Fuzzy measures: fuzzy arithmetic, fuzzy measures, measures of fuzziness, fuzzy integrals.</p>
5	UNIT 5
	<p>Genetic Algorithm: Biological Background, Traditional optimization and search techniques, genetic algorithm and search space, genetic algorithm vs. traditional algorithms, basic terminologies, simple genetic algorithm, general genetic algorithm, operators in genetic algorithm, stopping condition for genetic algorithm flow, constraints in genetic algorithm, problem solving using genetic algorithm, the schema theorem, classification of genetic algorithm, Holland classifier systems, genetic programming, advantages and limitations and applications of genetic algorithm.</p>

Reference Books
Soft Computing
<p>References :</p> <ol style="list-style-type: none"> 1. Artificial Intelligence and Soft Computing, Anandita Battacharya Das, SPD 3rd 2018 2. Principles of Soft computing S.N.Sivanandam , S.N.Deepa, Wiley 3rd 2019 3. Neuro-Fuzzy Computing and Soft J.S.R.Jang, C.T.Sun and E.Mizutani, Prentice Hall of India 2004 4. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S. Rajasekaran, G. A. Vijayalakshami Prentice Hall of India 2004 5. Fuzzy Logic with Engineering Applications Timothy J.Ross McGraw-Hill 1997



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