

SOFT COMPUTING

Paper Code: ETIT-410

Paper: Soft Computing

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INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the various concepts of neural networks and fuzzy logic.

UNIT-I

Neural Networks:

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

[T1, T2][No. of Hrs. 11]

UNIT-II

Fuzzy Logic:

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations.

[T1, T2][No. of Hrs. 11]

UNIT-III

Fuzzy Arithmetic:

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic:

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,

Uncertainty based Information:

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

[T1, T2][No. of Hrs. 11]

UNIT-IV

Introduction of Neuro-Fuzzy Systems:

Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic:

Medicine, Economics etc.

Genetic Algorithm:

An Overview, GA in problem solving, Implementation of GA.

[T1, T2][No of Hrs 11]

Text Books:

[T1] Hertz J. Krogh, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.

[T2] G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.

[T3] Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.

[T4] F. O. Karray and C. de Silva, "Soft computing and Intelligent System Design", Pearson, 2009.

Reference Books:

[R1] "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.

[R2] Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, (1992).