|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | 13CS41E4 | - | SOFT COMPUTING | | | | | | | | |
|  |  | |  | | | | |
| Hours / Week | : | 4 | |  | Sessional Marks | : | 40 |
| Credits | : | 4 | |  | End Examination Marks | : | 60 |

|  |
| --- |
| **UNIT - I** |
| **Fundamentals of Neural Networks**: Basic concepts of Neural Networks, Model of an Artificial Neuron, Neural Network Architectures, Characteristics of Neural Networks, Learning Methods, Taxonomy of Neural Network architectures, Early Neural Network Architectures, Applications  **Back-Propagation Networks**: Architecture of a Back propagation Network, Back propagation learning, Applications, Effect of Tuning parameters of the back propagation neural network, selection of various parameters in BPN, Variations of standard Back propagation Algorithm, Research Directions . |
|  |
| **UNIT – II** |
| **Associative Memory – Autocorrelators, Heterocorrelators**: Kosko’s Discrete BAM, Wang et al.’s Multiple Training Encoding Strategy, Exponential BAM, Associative Memory for Real-coded Pattern Pairs, Applications, Recent Trends.  **Adaptive Resonance Theory**: Introduction, ART1, ART2, Applications, Sensitivities of Ordering of Data  Fuzzy logic – Fuzzy versus Crisp, Crisp sets, Fuzzy sets, Crisp relations, Fuzzy relations, Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule based system, Defuzzification Methods, Applications |
|  |
| **UNIT – III** |
| **Fundamentals of Genetic Algorithms – Genetic Algorithms**: History, Basic concepts, Creation of offsprings, Working Principle, Encoding, Fitness Function, Reproduction.  **Genetic Modeling**: Inheritance Operators, Cross Over, Inversion and Deletion, Mutation Operator, Bit-wise Operators, Bit-wise Operators used in GA, Generational Cycle, Convergence of Genetic Algorithm, Applications, Multi-level Optimization, Real Life Problem, Differences and similarities between GA and other traditional methods, Advances in GA. |
|  |
| **UNIT – IV** |
| **Integration of Neural Networks**: Fuzzy Logic and Genetic Algorithms – Hybrid Systems, Neural Networks, Fuzzy Logic and Genetic Algorithms Hybrids, Preview of the Hybrid Systems to be discussed  Genetic Algorithm Based Back-Propagation Networks - GA based Weight Determination, Applications  Fuzzy Back Propagation Networks – LR-type Fuzzy numbers, Fuzzy Neuron, Fuzzy BP Architecture, Learning by Fuzzy BP, Inference by Fuzzy BP, Applications |
|  |
| **UNIT – V** |
| **Simplified Fuzzy ARTMAP – Fuzzy ARTMAP**: A Brief Introduction, Simplified Fuzzy ARTMAP, Working of Simplified Fuzzy ARTMAP, Application: Image Recognition, Recent Trends  **Fuzzy Associative Memories – FAM**: Introduction, Single Association FAM, Fuzzy Hebb FAMs, FAM Involving a Rule Base, FAM Rules with Multiple Antecedents/Consequents, Applications  **Fuzzy Logic Controlled Genetic Algorithms**: Soft Computing Tools, Problem Description of Optimum Design, Fuzzy Constraints, Illustrations, GA in Fuzzy Logic Controller Design, Fuzzy Logic Controller, FLC-GA Based Structural Optimization, Applications. |
|  |
|  |
| TEXT BOOKS |
| 1. Rajasekaran S, and Vijayalakshmi Pal G A, Neural Networks, Fuzzy Logic and Genetic Algorithms - Synthesis and Application, Prentice-Hall of India Pvt Ltd, 2003. |
|  |
| REFERENCE BOOKS |
| 1. Walker E A, A First Course in Fuzzy Logic, 2nd Edition, CRC Press, 1999. 2. Lu, Fuzzy Logic with Engineering Application, John Wiley, 2004. 3. Haupt, Genetic Algorithms, John Wiley, 1999. 4. Yegnanarayana B, Artificial Neural Networks, Prentice-Hall of India Pvt Ltd, 1999. |