

COURSE CONTENT:

1. Artificial Intelligence (AI) and Knowledge Based Systems (KBS)

- Natural and Artificial Intelligence
- Testing Intelligence with Turing Test, and Chinese Room Experiment, Application Areas of Artificial Intelligence, Data pyramid
- Production systems and AI Based Searches like Hill Climbing and Heuristic Search
- KBS Structure, Components of KBS, Categories of KBS, Knowledge-Based Shell, Advantages, Limitations and Applications of KBS
- Knowledge Acquisition, Knowledge Update
- Factual and Procedural Knowledge Representations
- Knowledge Based Systems Development Model

2. Fuzzy Logic

- Fuzzy Logic and Fuzzy Sets, Membership Functions,
- Fuzzification and Defuzzification
- Operations on Fuzzy Sets
- Fuzzy Functions and Linguistic Variables
- Fuzzy Relations, Propositions and Connectives
- Fuzzy Inference
- Fuzzy Rules, Fuzzy Control System and Fuzzy Rule Based Systems

3. Connectionist Models

- Introduction to ANN, Biological Neuron and Artificial Neuron
- Hopfield model of ANN, Parallel relaxation
- Linearly Separable Problems, Single perceptron
- Non Linearly Separable problems, Fixed increment perceptron learning
- Multi Layer Perceptron, Applications of ANN and Cases

4. Genetic Algorithms

- Introduction to Genetic Algorithm (GA),
- Fundamental Concepts of GA :Gene, Population, Fitness Functions, Generations
- Encoding Strategies, Genetic Operators, Fitness Functions
- Typical Genetic Algorithm Cycle
- Function Optimization, Designing Special Operators and Edge Recombination, Travelling Salesman Problem
- Schema, Genetic programming

MAIN REFERENCE BOOKS:

1. Rich and Knight, Artificial Intelligence, Tata McGraw Hill Publishing Co. Ltd., 21st Indian Reprint, 2001
2. Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009
3. Vijyalaxmi Pai and Rajasekaran, Neural Network, Fuzzy Logic and Genetic Algorithms, Prentice Hall of India, 2003
4. Web Resources

BOOKS FOR ADDITIONAL READING:

1. J S R Jang, C T Sun and E Mizutani, Neuro-Fuzzy Soft Computing, Prentice Hall of India Ltd., 1997
2. Peter Jackson, Introduction to Applied Expert systems, Pearson Education Ltd., Second Indian Reprint, 2001
3. David W Rolston: Principles of AI & ES Development, McGraw Hill, 1988.
4. David E. Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning, Pearson Education, 2002