COURSE NO: PS05CMCA01 ***w.e.f. June 2016***

Artificial Intelligence

(3 Lectures & 1 Seminar/Tutorial per Week Total Marks: 100)

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, Back propagation in multi layer perceptron
- General Learning Paradigms: Supervised and Unsupervised Learning
- Applications of ANN and Cases

4. Genetic Algorithms and Other Soft Computing Techniques

- 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
- Constituents of soft computing, Neuro-fuzzy Systems, Neuro-genetic systems and Neuro-fuzzy-genetic systems
- Multi agent systems: Agents, Typology, Multi agent structure and Examples
- Knowledge Management
- Intelligent Technologies for Web

MAIN REFERENCE BOOKS:

1. Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009
2. Rushell and Norvig, Modern Approach to Artificial Intelligence, Prentice Hall of India Ltd., 2006
3. Rich and Knight, Artificial Intelligence, Tata McGraw Hill Publishing Co. Ltd., 21st Indian Reprint, 2001
4. Vijyalaxmi Pai and Rajasekaran, Neural Network, Fuzzy Logic and Genetic Algorithms, Prentice Hall of India, 2003
5. Amrit Tiwan, The Knowledge Management Toolkit, Pearson Education Inc., Third Impression, 2008

BOOKS FOR ADDITIONAL READING:

1. Sajja P S and Akerkar RA, Advanced Knowledge-Based systems: Models, Applications and Research Trends, TMRF, Kolhapur, India, 2009
2. J S R Jang, C T Sun and E Mizutani, Neuro-Fuzzy Soft Computing, Prentice Hall of India Ltd., 1997
3. Peter Jackson, Introduction to Applied Expert systems, Pearson Education Ltd., Second Indian Reprint, 2001
4. David W Rolston: Principles of AI & ES Development, McGraw Hill, 1988.
5. David E.Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning, Pearson Education, 2002
6. Sajja, P.S. and Akerkar, R.A. “Intelligent technologies for web applications”, CRC Press, 2012