

MCPE2001 COMPUTATIONAL INTELLIGENCE (3-0-0)

Course Objectives:

1. To provide a strong foundation on fundamental concepts in Computational Intelligence
2. To Provide a basic exposition to the goals and methods of Computational Intelligence
3. To study of the design of intelligent computational techniques
4. To enable problem-solving through various searching techniques.

Module I

Introduction to Artificial Intelligence-Search-Heuristic Search-A* algorithm-Game Playing-Alpha-Beta Pruning-Expert Systems-Inference-Rules-Forward Chaining and Backward Chaining- Genetic Algorithms.

Module II

Proposition Logic — First Order Predicate Logic — Unification — Forward Chaining - Backward Chaining — Resolution — Knowledge Representation — Ontological Engineering — Categories and Objects — Events — Mental Events and Mental Objects — Reasoning Systems for Categories — Reasoning with Default Information — Prolog Programming.Non monotonic reasoning-Fuzzy Logic-Fuzzy rules-fuzzy inference-Temporal Logic-Temporal Reasoning-Neural Networks-Neuro-fuzzy Inference.

Module III

Probability basics — Bayes Rule and its Applications — Bayesian Networks — Exact and Approximate Inference in Bayesian Networks — Hidden Markov Models — Forms of Learning — Supervised Learning — Learning Decision Trees — Regression and Classification with Linear Models — Artificial Neural Networks — Nonparametric Models — Support Vector Machines — Statistical Learning — Learning with Complete Data — Learning with Hidden Variables- The EM Algorithm — Reinforcement Learning

Module IV

Natural language processing-Morphological Analysis-Syntax analysis-Semantic Analysis-AI applications — Language Models — Information Retrieval — Information Extraction — Machine Translation — Machine Learning — Symbol-Based — Machine Learning: Connectionist — Machine Learning.

Course Outcomes: Upon successful completion of this course, students should be able to:

- CO1:** Apply the Computational Intelligence techniques in applications which involve perception, reasoning and learning.
- CO2:** Apply Computational Intelligence techniques for information retrieval
- CO3:** Apply Computational Intelligence techniques primarily for machine learning.
- CO4:** Apply the Intelligent techniques for problem solving

Text Book:

1. Stuart Russell, Peter Norvig, —Artificial Intelligence: A Modern Approach, Third Edition, Pearson Education / Prentice Hall of India, 2010.

Reference Books:

1. Elaine Rich and Kevin Knight, —Artificial Intelligence, Third Edition, Tata McGrawHill, 2010.
2. Patrick H. Winston. "Artificial Intelligence", Third edition, Pearson Edition, 2006.
3. Dan W.Patterson, —Introduction to Artificial Intelligence and Expert Systems, PHI, 2006.
4. Nils J. Nilsson, —Artificial Intelligence: A new Synthesis, Harcourt Asia Pvt. Ltd., 2000.