MCPC2003 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (3-0-0)

Course Objectives:

1. To provide a strong foundation on fundamental concepts in Artificial 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 machine learning techniques.

Module I

Introduction to AI - Intelligent Agents, Problem-Solving Agents, **Searching for Solutions** - Breadth-first search, Depth-first search, Hill-climbing search, simulated annealing search, Local Search in Continuous Spaces. Heuristic functions, Hill Climbing, Best First Search, A*, Adversarial Search: Game Playing, Min-Max Search, Alpha - Beta Pruning.

Module II

Knowledge and Reasoning: A Knowledge Based Agent, WUMPUS WORLD Environment, Propositional Logic, First Order Predicate Logic, Forward and Backward Chaining. Expert Systems: Introduction, Design of Expert systems.

Module III

Introduction MLP. Type of Human Learning, Type of Machine Learning: Supervised, unsupervised, reinforcement, General Model of Learning Agents

Module IV

Supervised: holdout method, K-fold cross-validation method, boot strapping, simple-regression method, unsupervised: clustering, association, reinforcement learning model.

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

CO1: Apply the Computational Intelligence techniques in applications which involve searching, reasoning and learning.

CO2: Understand artificial intelligence techniques for information retrieval

CO3: Apply Computational Intelligence techniques primarily for machine learning.

CO4: Apply the machine learning techniques for problem solving and validating

Text Books:

1. Elaine Rich, Kevin Knight, Shivshankar B Nair, Artificial Intelligence, McGraw Hill, 3rdEdition.
2. Tom Mitchell, Machine Learning, McGraw Hill , 1997,

Reference Books

1. Richard O. Duda, Peter E. Hart, David G. Stork, Pattern classification, Wiley , (2nd edition).Wiley, New York, 2001
2. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”, 1st Edition,1996, PHI Learning Pvt. Ltd., New Delhi.
3. Nills J. Nilsson, “Artificial Intelligence: A New Synthesis”, 2nd Edition, 2000, Elsevier IndiaPublications, New Delhi.
4. Christopher M. Bishop, Pattern Recognition and Machine Learning, Springer , 2011 edition
5. Ian Goodfellow, YoshuaBengio, Aaron Courville, Deep Learning, MIT Press , 2016