# MCS- E6 Artificial Intelligence

**Unit 1** Introduction to Artificial Intelligence (AI), Problem Solving
State Space Search, - 8 Puzzle Problem
- Water Jug Problem

**Unit 2** Missionaries and Cannibals Problem
Blind Search: Depth First Search (DFS)
Blind Search: Breadth First Search (BFS)
Informed Search: Heuristic Function, Hill Climbing Search

**Unit 3** Best First Search
A* Search
AO* Search

**Unit 4** Constraint Satisfaction
Evaluation Function
Mini-Max Search
Alpha-Beta Pruning

**Unit 5** Branch and Bound Search
Introduction to KR (Knowledge Representation)
Knowledge Agent
Predicate Logic, WFF, Inference Rules & Theorem Proving, - Forward Chaining ,Backward Chaining

**Unit 6** Resolution
Propositional Knowledge
Boolean Circuit Agents, Rule-Based Systems
Forward Reasoning: Conflict Resolution, - Backward Reasoning: Use of Backtracking

**Unit 7** Semantic Net
- Slots, Inheritance
Frames, - Exceptions and Defaults, Attached Predicates
Conceptual Dependency

**Unit 8** Handling Uncertainty & Learning
Source of Uncertainty
Probabilistic Inference, Bayes' Theorem
Limitation of Naïve Bayesian System, Dempster-Shafer Theory

**Unit 9** Learning
Goal Stack Planning
Block World Problem

**Unit10** Introduction to Machine Learning (ML) in AI
Supervised Learning
Unsupervised Learning
Reinforcement Learning
Introduction to Natural Language Processing (NLP)

**Unit11** Parsing
Machine Translation

Introduction to Expert Systems
Need & Justification for Expert Systems, - Cognitive Problems, Case Studies of Expert Systems

**Unit12** Introduction to Prolog Programming, Installation
Facts, Rules, Clauses, and Lists in Prolog
Understanding Logical Operators in Prolog
Prolog Program for Various Relations, List Operations in Prolog, Union and Intersection, Wrap-up Summary of the Course

## Books and references


- **Stuart Russell and Peter Norvig., "Artificial Intelligence: A Modern Approach", Pearson**
- **Ivan Bratko., "Prolog Programming for Artificial Intelligence, Addison-Wesley"**