

## **Artificial Intelligence**

**IT-605D**

**Contracts: 3L**

**Credits- 3**

### **Introduction [2]**

Overview of Artificial intelligence- Problems of AI, AI technique, Tic - Tac - Toe problem.

### **Intelligent Agents [2]**

Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents.

### **Problem Solving [2]**

Problems, Problem Space & search: Defining the problem as state space search, production system, problem characteristics, issues in the design of search programs.

### **Search techniques [5]**

Solving problems by searching :problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies.

### **Heuristic search strategies [5]**

Greedy best-first search, A\* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search, genetic algorithms; constraint satisfaction problems, local search for constraint satisfaction problems.

### **Adversarial search [3]**

Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.

### **Knowledge & reasoning [3]**

Knowledge representation issues, representation & mapping, approaches to knowledge representation, issues in knowledge representation.

### **Using predicate logic [2]**

Representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction.

### **Representing knowledge using rules [3]**

Procedural verses declarative knowledge, logic programming, forward verses backward reasoning, matching, control knowledge.

### **Probabilistic reasoning [4]**

Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Fuzzy sets & fuzzy logics.

### **Planning [2]**

Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques.

### **Natural Language processing [2]**

Introduction, Syntactic processing, semantic analysis, discourse & pragmatic processing.

### **Learning [2]**

Forms of learning, inductive learning, learning decision trees, explanation based learning, learning using relevance information, neural net learning & genetic learning.

### **Expert Systems [2]**

Representing and using domain knowledge, expert system shells, knowledge acquisition.

### **Basic knowledge of programming language like Prolog & Lisp. [6]**

#### **Books:**

1. Artificial Intelligence, Ritch & Knight, TMH
2. Artificial Intelligence A Modern Approach, Stuart Russel Peter Norvig Pearson
3. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
4. Poole, Computational Intelligence, OUP
5. Logic & Prolog Programming, Saroj Kaushik, New Age International
6. Expert Systems, Giarranto, VIKAS
7. Artificial Intelligence, Russel, Pearson