**20XW62 ARTIFICIAL INTELLIGENCE**

**3 0 0 3**

**PREREQUISITES**

* 20XW22DISCRETE STRUCTURES
* 20XW23 DATA STRUCTURES AND ALGORITHMS
* 20XW31 PROBABILITY AND STATISTICS

**INTRODUCTION:**  The foundations of AI - The History of AI - Intelligent agents - Agent based system. (2)

**PROBLEM SOLVING:**  State Space models - Searching for solution - Uninformed/Blind search - Informed/ Heuristic search - A\* search - Hill-climbing search - Meta Heuristic: Genetic Algorithm - Adversary based search : Minimax - Expectimax – Alpha Beta pruning – Constraint satisfaction problem - Backtracking search (10)

**KNOWLEDGE REPRESENTATION AND REASONING**: Knowledge representation - Logics - bivalent logic - inference - Fuzzy logic: membership - Fuzzy rules and reasoning - Fuzzy inference (11)

**UNCERTAIN KNOWLEDGE AND PROBABILISTIC REASONING**: Uncertainty - Probabilistic reasoning - Semantics of Bayesian network - Exact inference in Bayesian network- Approximate inference in Bayesian network - Probabilistic reasoning over time – Inference in temporal models - Hidden Markov Models – Dynamic Bayesian Networks (11)

**DECISION-MAKING**: Basics of utility theory, Utility functions - Sequential decision problems - Markov decision process - Value iteration - Policy iteration - Decisions in Multi agent system: Multi agent decision theory - Group decision making (11)

**Total: L: 45**

**TEXTBOOKS:**

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach”, Pearson Education, 2020.
2. David Pool and Alan Mackworth, “Artificial Intelligence: Foundations of Computational agents”, Cambridge University Press, 2017.
3. Timothy Ross, “ Fuzzy Logic with Engineering Applications”, John Wiley and sons, 2016.

**REFERENCES:**

1. Christopher M.Bishop, “Pattern Recognition and Machine Learning”, Springer, 2013.
2. Nils J. Nilsson, “The Quest for Artificial Intelligence: A History of Ideas and achievements”, Cambridge University Press, 2010.
3. Daphne Koller and N Friedman, “Probabilistic Graphical Models - Principles and Techniques”, MIT press, 2009.

**Total P:30**

**CO1**

**INTRODUCTION:**  The foundations of AI - The History of AI - Intelligent agents - Agent based system. **PROBLEM SOLVING:**  State Space models - Searching for solution - Uninformed/Blind search -Informed/ Heuristic search - A\* search

**CO2**

Hill-climbing search - Meta Heuristic: Genetic Algorithm - Adversary based search : Minimax - Expectimax – Alpha Beta pruning – Constraint satisfaction problem - Backtracking search

**CO3**

**KNOWLEDGE REPRESENTATION AND REASONING**: Knowledge representation - Logics - bivalent logic - inference - Fuzzy logic: membership - Fuzzy rules and reasoning - Fuzzy inference

**CO4**

**UNCERTAIN KNOWLEDGE AND PROBABILISTIC REASONING**: Uncertainty - Probabilistic reasoning - Semantics of Bayesian network - Exact inference in Bayesian network- Approximate inference in Bayesian network - Probabilistic reasoning over time – Inference in temporal models - Hidden Markov Models – Dynamic Bayesian Networks

**CO5**

**DECISION-MAKING**: Basics of utility theory, Utility functions - Sequential decision problems - Markov decision process - Value iteration – policy iteration - Decisions in Multi agent system: Multi agent decision theory - Group decision making