

ARTIFICIAL INTELLIGENCE (ELECTIVE-1) (Common to CSE & IT)

Course Code :13CT1127

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Course Educational Objectives:

The main objective of the course is to introduce Artificial Intelligence, Knowledge Representation and Game Playing. Upon completion of this course, the student should be able to:

- ❖ Learn what AI is?
- ❖ Define problems, problem space and search spaces.
- ❖ Learn heuristic search techniques.
- ❖ Know the knowledge representation.
- ❖ About game playing.

Course Outcomes:

At the end of the course the student will be able to

- ❖ Understand the Basics of Artificial Intelligence.
- ❖ Understand the Searching for solutions, uninformed search strategies.
- ❖ Understand the Knowledge Representation & First Order Logic.
- ❖ Understand the Planning, Uncertainty and Practice.
- ❖ Understand the Basics of neural networks.

UNIT-I

(14 Lectures)

INTRODUCTION:

AI problems, foundation of AI and history of intelligent agents, Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

SEARCHING:

Searching for solutions, uninformed search strategies- Breadth first search, depth first search, Search with partial information (Heuristic search) Greedy best first search , A*search. Game Playing: Adversarial search, Games, minimax algorithm, optimal decisions in multiplayer games, Alpha Beta pruning, Evaluation functions, cutting of search.

UNIT-II**(12 Lectures)****KNOWLEDGE REPRESENTATION:**

Knowledge Based agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward and Backward chaining.

FIRST ORDER LOGIC:

Inference in first order logic, propositional vs first order inference, unification and lifts, forward chaining, backward chaining, resolution

UNIT-III**(12 Lectures)****PLANNING :**

Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state-space search, Forward state space search, Backward state space search, Heuristics for state space search. Planning search, planning with state space search, partial order planning graphs.

UNIT-IV**(14 Lectures)****UNCERTAINTY:**

Acting under uncertainty, Basic probability notation, axioms of probability, Inference using Full joint distributions, Baye's Rule and its use. Probabilistic Reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian Networks, Efficient representation of conditional distributions. Exact inference in Bayesian networks.

PROBABILISTIC REASONING OVER TIME:

Time and Uncertainty, Inference in Temporal models, Hidden Markov models, Kalman Filters, Dynamic Bayesian Networks, Speech Recognition.

UNIT-V**(10 Lectures)****LEARNING :**

Forms of learning, Induction learning, Learning Decision trees, statistical learning methods, learning with complex data, learning with hidden variables-the EM algorithm, instance based learning, neural networks.

TEXT BOOKS:

1. Stuart Russel, Peter Norvig , “*Artificial Intelligence-A Modern Approach*”, 2nd Edition PHI/Pearson Education , 2003.

REFERENCES:

1. Patrick Henry Winston , “*Artificial Intelligence*”, 3rd Edition, Pearson Edition, 2001.
2. E.Rich and K.Knight , “*Artificial Intelligence*”, 3rd Edition, TMH, 2008.
3. Patterson, “*Artificial Intelligence and Expert Systems*”, 2nd Edition, PHI, 2008.

WEB REFERENCES:

<http://nptel.iitm.ac.in/video.php?subjectId=106105079>

