23CS31O2- INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Course Category:	Open Elective - I	**Credits:**	3
Course Type:	Theory	**Lecture-Tutorial-Practical:**	3-0-0
Prerequisite:	• Knowledge in Introduction To Artificial Intelligence	**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	30 70 100
Course Objectives:	**Students undergoing this course are expected:**		
	• To learn the distinction between optimal reasoning Vs. human like reasoning. • To understand the concepts of state space representation, exhaustive search, heuristic • Search together with the time and space complexities. • To learn different knowledge representation techniques. • To understand the applications of AI, namely game playing, theorem proving, and machine learning		

Course Outcomes:	**Upon successful completion of the course, the students will be able to:**	
	CO1	Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
	CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
	CO3	Learn different knowledge representation techniques.
	CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
	CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks
	CO6	Analyze Supervised Learning Vs. Learning Decision Trees.
Course Content:	**UNIT-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 **UNIT-II** **Games:** Optimal Decisions in Games, Alpha–Beta Pruning, Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Knowledge-Based Agents, Logic- Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses.	

	UNIT-III **First-Order Logic:** Syntax and Semantics of First-Order Logic, Using First Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution. **Knowledge Representation:** Ontological Engineering, Categories and Objects, Events **UNIT-IV** **Planning:** Definition of Classical Planning, Algorithms for Planning with State Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches. Hierarchical Planning. **UNIT-V** **Probabilistic Reasoning:** Acting under Uncertainty, Basic Probability Notation Bayes' Rule and Its Use, Probabilistic Reasoning, Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First- Order Probability
Text Books & References Books:	**TEXTBOOKS:** 1. Artificial Intelligence: A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education. **REFERENCE BOOKS:** 1. Artificial Intelligence, 3rd Edn., E. Rich and K. Knight (TMH) 2. Artificial Intelligence, 3rd Edn., Patrick Henny Winston, Pearson Education. 3. Artificial Intelligence, Shivani Goel, Pearson Education. 4. Artificial Intelligence and Expert systems – Patterson, Pearson Education
E-Resources:	**NPTEL**