

**Course: Elective
Advanced Artificial Intelligence**

Semester: I	Credits:4	Subject Code:SMAJEAAI123556	Lectures: 60
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Course Outcomes:

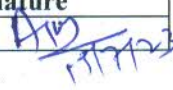
At the end of this course, the learner will be able to:

- CO1- Understand the informed and uninformed problem types and apply search strategies to solve them.
- CO2- Differentiate between biological neuron, artificial neuron, the application areas of neural networks, and building blocks of Neural Networks
- CO3-Apply difficult real-life problems in a state space representation to solve them using AI techniques like searching and game playing
- CO4- Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques
- CO5- Categorize the machine learning algorithms as supervised learning and unsupervised learning and apply and analyze the various algorithms of supervised and unsupervised learning
- CO6-Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area.

Unit 1:Introduction to Artificial Intelligence and searching algorithm	15
<ul style="list-style-type: none"> • Introduction to Artificial Intelligence-Introduction and Intelligent systems, What Is AI?,The Foundations of Artificial Intelligence , The History of Artificial Intelligence, Applications of AI, Early work in AI and related fields, AI problems and Techniques. • Searching-Defining AI problems as a State Space Search(Search and Control Strategies, Problem Characteristics,Issues in Design of Search Programs, Production System),Blind Search Techniques-(BFS, DFS, DLS, Iterative Deepening Search, Bidirectional Search, Uninformed cost Search),Heuristic search techniques: Generate and test ,Hill Climbing,Best First search ,Constraint Satisfaction ,Mean-End Analysis,A*,AO* 	

Unit 2:Knowledge Representation	15
<ul style="list-style-type: none"> • Knowledge Representation-Representations and Mappings, Approaches to Knowledge Representation, Knowledge representation method,Propositional Logic, Predicate logic, Representing Simple facts in Logic, Resolution,Forward and backward chaining • Knowledge Representation Structure-Weak Structures, Strong Structures, Semantic Networks, Frames, Conceptual Dependencies, Scripts. 	

Unit 3: Game playing and machine learning	15
<ul style="list-style-type: none"> • Game Playing-Minimax Search Procedures, Adding alpha-beta cutoffs, • Machine Learning-Why Machine learning,Types of Machine Learning: Supervised learning- Classification & Regression-Decision tree,Random Forest,KNN, Logistic 	

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Chairperson (HoD)	Computer Science	Mrs. Ashwini Kulkarni	



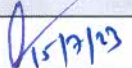
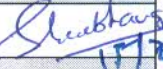
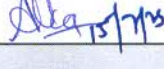
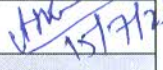
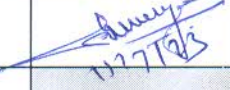
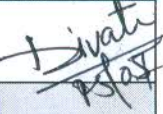
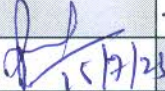
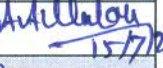
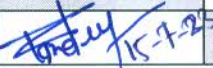


algorithms, Unsupervised learning-Clustering & Association-K-means for clustering , Apriori algorithm. Support Vector Machine (SVM), Reinforcement learning.

Unit 4: Artificial Neural Networks	15
<ul style="list-style-type: none"> Artificial Neural Networks (ANN) Biological neuron structure and functions Structure and functions of Artificial Neuron. Difference between biological and Artificial Neural Network Artificial neural network terminologies The basic building blocks of Artificial Neural Network- Network Topology - Feed forward Network, Single layer feed forward network, Multilayer feed forward network Feedback Network-Recurrent networks, recurrent network, Jordan network Adjustments of Weights or Learning-Supervised Learning, Unsupervised Learning, Reinforcement Learning Activation Functions-Binary sigmoidal function, Bipolar, sigmoidal function Applications of ANN, Advantages and Limitation Self-Organising Systems-Unsupervised Learning, Kohonen's self-organizing map Feedback neural networks-Hopfield model, Boltzmann machine 	

Reference Books:

- Eberhart, *Computational Intelligence*, Elsevier Publication
- Ethem Alpaydin, *Introduction to Machine Learning*, PHI 2nd Edition
- Nilsson, *Artificial Intelligence: A New Synthesis*, Elsevier Publication
- Prateek Joshi, *Artificial Intelligence with Python*, Packt Publishing Ltd
- Satish Kumar, *Neural Networks – A Classroom Approach*, Tata McGraw-Hill

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