

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2 Computer Engineering

Subject Name Artificial Intelligence

Sr.No	Course content
1.	Introduction: What is artificial Intelligence? Major areas of Artificial Intelligence, Introduction to AI Problems and applications, Defining problems as a state space search, Production systems.
2.	Search techniques: Breadth first search, Depth first search, Hill climbing, Best first search, A* algorithm, AO* Algorithm, Iterative Deepening Search, IDA*, Recursive Best First Search, Constraint Satisfaction and Heuristic Repair, Applications.
3.	Game Playing: Introduction to Game playing, The Minimax Search Procedure, Alpha-Beta Procedure, The Search Efficiency of Alpha-Beta Procedure, Recent applications.
4.	Knowledge Representation: Production rules, Predicate Calculus- Rules of Inference; Semantics and Deduction; Unification; Soundness and completeness of rules; Resolution; Resolution refutation, Semantic Nets, Frames, symbolic reasoning, statistical reasoning.
5.	Learning: Definition, Rote learning, learning by taking advice, learning in problem solving, learning from examples, induction.
6.	Uncertain Reasoning: Joint probability, Marginal probability, Probabilistic reasoning and Bayes Nets, forward reasoning versus backward reasoning, Certainty Factors, Fuzzy set theory, Fuzzy relation, fuzzification, Fuzzy value assignment methods, Inference and Composition methods- Min-Max composition, max product composition, Defuzzification methods, Applications and recent developments.
7.	Expert Systems (ES): Advantages and characteristics of Expert System, Knowledge engineering, Steps in Developing an Expert System, Mycin, ES Applications and recent developments.
8.	Evolutionary Computing: Theoretical Background of Genetic Algorithms and Applications.
9.	Connectionist Models: Introduction to Neural Network, Activation functions, Supervised and Unsupervised Learning, Neuro Processing and Neural Network Learning, Learning, Learning rules, Single layer Perceptrons and Classification, Introduction to Multilayer Neural Networks, Neural Network Applications and recent developments.

Reference Books:

1. E. Rich, K. Knight, Artificial Intelligence, TMH.
2. N. J. Nilsson, Artificial Intelligence: A New Synthesis, Harcourt Publishers.
3. Tomthy Ross, Fuzzy Logic and Engineering Application, McGraw Hill International.
4. Giarratano, Expert System Principles and Programming.
5. Kishan Mehrotra, Elements of Artificial Neural Network.
6. E. Goldberg, Genetic Algorithms: Search and Optimization.
7. J. M. Jurada, Neural Networks.