

Faculty of Science and Technology
R.T.M Nagpur University, Nagpur
Syllabus for B. Tech. Fifth Semester CT
Artificial Intelligence (TH)

Total Credits: 3	Subject Code: BTCT505T
Teaching Scheme : Lectures: 3 Hours/Week Tutorials: 0 Hours/Week Practical: 0 Hours/Week	Examination Scheme : Duration of University Exam : 3 hrs. College Assessment : 30Marks University Assessment: 70Marks

Course Objectives:

To make students

1. To understand necessary depth of the fundamental techniques of Artificial Intelligence.
2. To capable of using heuristic search techniques.
3. To aware of knowledge based systems.
4. To learn various applications domains AI.
5. To able to use fuzzy logic and neural networks and Genetic algorithm.

Course Outcomes:

After completion of the course, students will be able to -

1. Explain the basics of the theory of AI and different informed and uninformed search algorithms.
2. Formulate and solve given problem using Propositional and First order logic.
3. Describe various knowledge representation techniques and to apply reasoning for non-monotonic AI problems.
4. Describe various application domain of AI such as Expert system, Game Playing, Natural Language Processing.
5. Apply neural network learning and evolutionary algorithms such as Genetic Algorithms for solving AI problems.

UNIT I (8 Hrs)

Introduction to AI: Definition of AI, Early work in AI, Importance of AI and related fields, Task domains of AI systems, Intelligent agents, Generic architecture of intelligent agent.

Basics of problem solving: Defining the problem on a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search programs.

UNIT II (8 Hrs)

Heuristic search techniques: Generate and test, Hill climbing, Best-first search, Problem reduction, Constraint satisfaction, Means-ends analysis.

Knowledge Representation: Representation and mapping, Approaches and Issues. Introduction to proposition logic, Knowledge representation using predicate logic, Unification and resolution. Representing knowledge using rules, procedural Vs declarative knowledge, logic programming, forward Vs backward reasoning, matching.

UNIT III (8 Hrs)

Knowledge representation: Network representation schemes - Semantic networks, conceptual graphs, Conceptual dependency, Structured representation schemes – Frames, Scripts.

Statistical reasoning: Symbolic Vs Statistical reasoning, Nonmonotonic and monotonic reasoning, Probability and Bayes' theorem, Certainty factors and rule based systems, Bayesian networks, Introduction to fuzzy logic.

UNIT IV (6 Hrs)

Expert systems: Characteristic features of expert system, Architecture of expert system, Expert system shell.

Game playing: Minimax search procedure, adding alpha-beta cutoffs.

Natural Language Processing: Overview of linguistics, Grammar and languages, basic parsing techniques, semantic analysis and representation structures.

UNIT V (6 Hrs)

Artificial Neural Network: Introduction, Neural Network representation, neural learning, Knowledge representation in ANN, application of neural networks.

Genetic Algorithm: Motivation, GA cycle, genetic operators, GA based Machine Learning, illustrative example.

TEXT BOOK:

1. E. Rich & K. Knight, S. B. Nair "Artificial Intelligence", Tata McGraw Hill Publications, 2008.
2. D. W. Patterson, "Introduction to Artificial Intelligence and Expert System", PHI Pub., 1997.
3. K. Uma Rao, "Artificial Intelligence and Neural Networks" Pearson Education, 2011.
4. [David E. Goldberg](#), "Genetic Algorithms in search, optimization and machine learning", Pearson Education, 2002.