

Course Title: Introduction to Artificial Intelligence.

Course no: CSC-355

Full Marks: 70+10+20

Credit hours: 3

Pass Marks: 28+4+8

Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

Course Synopsis:

This course introduces the problem solving techniques, problem representation and machine learning.

Goal:

The main objective of this course is to provide basic knowledge of Artificial Intelligence, with acquaintance of different search techniques and AI applications.

Course Contents:

Unit 1. Introduction to Artificial Intelligence 4 Hrs.

Artificial Intelligence and related fields, brief history of AI, applications of Artificial Intelligence, Definition and importance of Knowledge, and Learning.

Unit 2. Problem Solving 6 Hrs.

Problem Definition, Problem as a state space search, Problem formulation, Problem types, Well-defined problems, Constraint satisfaction problem, Game playing, Production systems.

Unit 3. Search Techniques 9 Hrs.

Uninformed search techniques- depth first search, breadth first search, depth limit search, and search strategy comparison, Informed search techniques-hill climbing, best first search, greedy search, A* search, Adversarial search techniques-minimax procedure, alpha beta procedure.

Unit 4. Knowledge Representation, Inference and Reasoning 12 Hrs.

Formal logic-connectives, truth tables, syntax, semantics, tautology, validity, well-formed-formula, propositional logic, predicate logic, FOPL, interpretation, quantification, horn clauses, rules of inference, unification, resolution refutation system (RRS), answer extraction from RRS, rule based deduction system, Statistical Reasoning-Probability and Bayes' theorem and causal networks, reasoning in belief network .

Unit 5. Structured Knowledge Representation 4 Hrs.

Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation, Semantic nets, frames, conceptual dependencies and scripts.

Unit 6. Machine Learning**4 Hrs.**

Concepts of learning, learning from examples, explanation based learning, learning by analogy, learning by simulating evolution, learning by training neural nets, learning by training perceptions.

Unit 7. Applications of Artificial Intelligence**6 Hrs.**

Expert Systems, Neural Network, Natural Language Processing, Machine Vision.

Laboratory work:

Laboratory exercises should be conducted in either LISP or PROLOG. Laboratory exercises must cover the fundamental search techniques, simple question answering, inference and reasoning.

Text / Reference books:

- E. Rich and Knight, Artificial Intelligence, McGraw Hill.
- D. W. Patterson, Artificial Intelligence and Expert Systems, Prentice Hall.
- P. H. Winston, Artificial Intelligence, Addison Wesley.
- Stuart Russel and Peter Norvig, Artificial Intelligence A Modern Approach, Pearson.
- Ivan Bratko, PROLOG Programming for Artificial Intelligence, Addison Wesley.