

Objective:

The primary objective of this course is to provide an introduction to the basic principles and applications of Artificial Intelligence that includes problem solving, knowledge representation, reasoning, decision making, planning, perception & action, and learning.

Theory:**UNIT I Introduction to AI**

Introduction to Artificial Intelligence (AI); Scope of AI: Games, theorem proving, natural language processing, robotics, expert system.

UNIT II Introduction to Knowledge based system

General concept of knowledge, Knowledge based system, Representation of knowledge, Knowledge organization and manipulation, Acquisition of knowledge.

UNIT III Symbolic approach (PL and FOPL)

Syntax and Semantics for Propositional Logic (PL) and First order predicates logic (FOPL), Properties of well formed formulas (wffs), Conversion to clausal form, Inference rules, Resolution principle, Non deductive inference methods.

UNIT IV Search and Control strategies

Blind search, Breadth- first search, Depth – First search, Hill climbing method, Best – First search, Branch and Bound search., A* and AO* search.

UNIT V Expert Systems & Introduction to Neural Network

Introduction to expert system, Characteristics features of expert system, Applications, Importance of Expert system, Rule based system architecture; Software Agents, Introduction to Neural Network.

Practical:

1. Inference in first-order logic : Inference rules, Forward chaining, Backward chaining, Resolution : Unification, Clausal form ,Resolution as search
2. Search and Control strategies: Blind search, Breadth- first search, Depth – First search, Hill climbing method, Best – First search, Branch and Bound search
3. Learning by induction
4. Genetic algorithms
5. Fuzzy Operations
6. Neural Network
7. Case study of a rule based expert system and Construction of Decision tree.

Tools and Packages: SWI-prolog, JavaNNS, Matlab

Reference books:

1. Akerkar, R. 2005. *Introduction to Artificial Intelligence*. Prentice-Hall of India.
2. Giarratano, J. and Riley, G. 1998. *Expert Systems - Principles and Programming*. PWS Publishing
3. Company.
4. Gonzalez, A. and Dankel, D. 2004. *The Engineering of Knowledge-Based Systems*. Prentice Hall.
5. Jackson, P. 1999. *Introduction to Expert Systems*. Addison Wesley.

6. Nilson, N. J. 2000. *Artificial Intelligence: A New Synthesis*. Morgan Kaufman Publishers, San Francisco.
7. Nilson, N.J. 2001. *Principles of Artificial Intelligence*. Narosa publishing House.
8. Rich, E. and Knight, K. 2002. *Artificial Intelligence*. Tata McGraw Hill, New Delhi.
9. Russell, S. and Norvig, P. 2003. *Artificial Intelligence: A Modern Approach*. Prentice Hall.