

CS305 Artificial Intelligence

Credits: 3-0-0-3

Approval: Approved in 3rd Senate

Students intended for: 3rd year B. Tech. CSE/EE/ME students

Elective or Core: Elective

Prerequisite: Consent of the faculty member

Semester: Odd or Even

Course objective:

This course covers the basic ideas and methods underlying the design of intelligent computer systems. Some of the topics include heuristic search, problem solving, game playing, knowledge representation, logical inference, planning, reasoning under uncertainty, expert systems, learning, perception, robotics, and language understanding. This course is an introductory course covering core competencies and it forms an essential ingredient for those who are interested in future topics like machine learning, cognitive modelling, natural language processing, and computer vision.

Course content:

- **Introduction:** Overview and Historical Perspective; Turing test, Physical Symbol Systems and the scope of Symbolic AI; Agents.
- **Weak Methods:** Search Methods, Heuristic Search, Goal Trees; Optimization, Probabilistic Methods; Game Trees; Planning and Constraint Satisfaction Problems - Waltz Algorithm.
- **Knowledge representation:** Logic, Conceptual Dependency Theory, and Frames; Theorem Proving, Forward Reasoning and Rete Networks; Backward Reasoning, Resolution Method and Logic Programming; Semantic Networks, Inheritance and Aggregation Hierarchies; Case Based Reasoning and Learning; Truth maintenance systems, Default and Probabilistic Reasoning, Dempster-Shafer Theory.

Text Books:

Russell, S., and Norvig, P., Artificial Intelligence: A Modern Approach, Prentice Hall, Englewood Cliffs, NJ, 1995.

Winston, P. H., Artificial Intelligence, Addison-Wesley, Reading Massachusetts, 1992.

Patterson, D.H., Introduction to Artificial Intelligence and Expert Systems, Prentice Hall of India, New Delhi, 2001.

Charniak, E., and McDermott, D., Introduction to Artificial Intelligence, Addison-Wesley, Reading Massachusetts, 1984.

Rich, E., and Knight, K., Artificial Intelligence, Tata McGraw Hill, New Delhi, 1991.