

Course Learning Outcome:

After successful completion of this course, student will be able to

- understand the significance and domains of Artificial Intelligence and knowledge representation
- understand the design concepts of control and search strategies
- design simple applications like games and expert system using Artificial Intelligence

Syllabus:**Introduction to Artificial Intelligence Overview:**

Knowledge: General concepts, definition and importance of knowledge, knowledge based system, representation, organization, manipulation and acquisition of knowledge.

Problems, Problem Spaces and State Space Search: The AI Problems, The Underlying Assumption, What Is An AI Techniques, The Level Of The Model, Criteria For Success, Some General References, One Final Word. Defining The Problems As a State Space Search, Production Systems, Production Characteristics, Production System Characteristics, and Issues In The Design Of Search Programs.

Search and Control Strategies: Uninformed (Blind) and informed search, DFS, BFS, Heuristic Search Techniques : Generate-And-Test, Hill Climbing, Best-First Search, A*, AO*, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

Knowledge Representation: Knowledge Representation Issues, Representations and Mappings, Approaches to Knowledge Representation, Using Predicate Logic Representation Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution. Representing Knowledge Using Rules, Procedural versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning.

Weak Slot-And-Filler Structure: Semantic Nets, Frames.

Reasoning: Symbolic Reasoning under Uncertainty, Introduction to Non-monotonic Reasoning, Logics for Non-monotonic Reasoning. Statistical Reasoning , Probability And Bay's Theorem, Certainty Factors And Rule-Base Systems, Bayesian Networks, Dumpster-Shafer Theory.

Game Playing: Overview and Example Domain, Min-max Search, Adding Alpha-Beta Cutoffs.

Expert System: Introduction, Architecture, and Types of Expert Systems, Expert System shell.

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Tutorial Work: Tutorial work will be based on above syllabus with minimum 10 tutorials to be incorporated.

References:

1. Russel and Norvig, Artificial Intelligence,
2. Elaine Rich And Kevin Knight, Artificial Intelligence, Tata McGraw-Hill
3. D.W.Patterson, Artificial Intelligence And Expert Systems, Prentice Hall
4. D.W.Rolston , Artificial Intelligence And Expert System Development, McGraw-Hill

5. Ivan Bratko, PROLOG Programming For Artificial Intelligence, Addison-Wesley