

## CSH 511: Artificial Intelligence

**Teaching Scheme**  
 Lectures: 4 hrs/Week  
 Tutorials: 2 hr/Week  
  
 Credits: 6

**Examination Scheme**  
 Class Test -20 Marks  
 Teachers Assessment – 10 Marks  
 Attendance – 20 Marks  
 End Semester Exam – 100 marks

**Prerequisite:** - CSH101 C Programming, CSH201 Discrete Mathematics.

### Course Objectives:

1. To understand how these algorithms works so the main objective of this course is and how to analyze the data to make a proper decision.
2. To know the application areas and building blocks of AI as presented in terms of intelligent agents.
3. To initiate the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems in different fields.
4. To evaluate the different stages of development of the AI field from human like behavior to Intelligent Agents.
5. To build intelligent machine which can perform and act like humans.

### Detailed Syllabus

#### Unit-1

**Introduction:** Overview of Artificial Intelligence- Problems of AI, AI and related fields. **Problem Solving:** Problems, Problem Space & Search: Defining the Problem as State Space Search, Production System, Problem Characteristics, issues in the design of Search Programs.

#### Unit-2

**Search Techniques:** Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Comparing Uniform Search Strategies, Greedy Best-First Search, A\* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search.

#### Unit-3

**Knowledge representation:** Knowledge Representation Issues, Representation and Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation, Knowledge manipulation, Knowledge acquisition.

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**Unit-4**

**Using Predicate Logic:** Representing Simple Fact in Logic, Representing Instant & ISA Relationship, Computable Functions & Predicates, Resolution, natural deduction.  
**Representing Knowledge Using Rules:** Procedural Verses Declarative Knowledge, Logic Programming, Forward Verses Backward Reasoning, Matching, Control Knowledge.

**Unit-5**

**Natural Language Processing:** Introduction, Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing.

**Unit-6**

**Expert System:** Rule based system architecture, Non production system architecture, knowledge organization and validation, Existing Systems (DENDRAL, MYCIN).

**Text and Reference Books**

1. "Artificial Intelligence", Ritch & Knight, TMH, 2006.
2. "Introduction to Artificial Intelligence & Expert Systems", Patterson, PHI, 2007.
3. "Artificial Intelligence: A Modern Approach", Russell, S., Norvig, P, Pearson Education, 2006.
4. "Introduction to A.I.", Charnick, Addison Wesley, 1999.

**Course Outcomes:**

After completing the course, students will be able to:

1. How to solve a particular problem by using different algorithms which is impossible for humans.
2. How to make proper decisions by gathering information and analyzing them.
3. How expert system works and perform tasks.
4. How to convert a particular sentence into logical statement.
5. Analyze the problem as a state space, graph, design heuristics and select amongst different search-based techniques to solve them.
6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing.