# MCA 503 Artificial Intelligence

| Teaching Scheme | Examination Scheme |
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| Lectures: 3 hrs/Week<br>Tutorials: 1 hr/Week<br><br>Credits: 4 | Class Test -12Marks<br>Teachers Assessment - 6Marks<br>Attendance – 12 Marks<br>End Semester Exam – 70 marks |

**Prerequisite:** - Artificial Intelligence is the sub-division of computer science and the main goal is to enable a smart device perform activities that are normally done by people, so before starting in the field of AI we should have knowledge about advanced mathematics(e.g. correlation algorithm) (Computer based optimization techniques MCA204), programming language(data structure MCA201, C MCA101) etc..

**Course Objectives:**
1. The main objective of AI to build intelligent machine which can perform and act like humans.
2. so the main objective of this course is to understand how these algorithms works and how to analyze the data to make a proper decision.
3. As we know AI is in used in all fields like healthcare industry, mobile world, Retail, Fraud detection etc. so demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
4. 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.
5. To evaluate the different stages of development of the AI field from human like behavior to Intelligent Agents.

**Detailed Syllabus**

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| **UNIT I**<br>Introduction: Overview Of Artificial Intelligence- Problems Of AI, AI Technique. 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 II**<br>Search Techniques: Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Bidirectional Search, Comparing Uniform Search Strategies, Greedy Best-First Search, A* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search, Simulated Annealing Search, Local Beam Search, Genetic Algorithms. |
| **UNIT III**<br>Knowledge representation: Knowledge Representation Issues, Representation and Mapping, Approaches To Knowledge Representation, Issues In Knowledge Representation, Knowledge manipulation, Knowledge acquisition. |
| **UNIT IV**<br>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 V**

Probabilistic Reasoning: Representing Knowledge in An Uncertain Domain, The Semantics of Bayesian Networks, Dempster-Shafer Theory. Natural Language Processing : Introduction, Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing.

**UNIT VI**

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,  Addision Wesley, 1999.

**Course Outcomes:**

After completing the course, students will be able to know:

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| 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. |