ELECTIVE – I : ARTIFICIAL INTELLIGENCE

CLASS B.E. (INFORMATION TECHNOLOGY) SEMESTER VII

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Prerequisite: programming language like JAVA or Python

Objective: This course will introduce the basic ideas and techniques underlying the design of intelligent computer systems. Students will develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents. This course will attempt to help students understand the main approaches to artificial intelligence such as heuristic search, game search, logical inference, decision theory, planning, machine learning, neural networks and natural language processing. Students will be able to recognize problems that may be solved using artificial intelligence and implement artificial intelligence algorithms for hands-on experience

1. Artificial Intelligence: Introduction to AI, History of AI, Emergence Of Intelligent Agents

2. Intelligent Agents: PEAS Representation for an Agent, Agent Environments, Concept of Rational Agent, Structure of Intelligent agents, Types of Agents.


5. Adversarial Search: Games, Minimax Algorithm, Alpha Beta pruning.


7. Knowledge Engineering: Ontology, Categories and Objects, Mental Events and Objects.

9. **Uncertain Knowledge and Reasoning**: Uncertainty, Representing knowledge in an Uncertain Domain, Overview of Probability Concepts, Belief Networks, Simple Inference in Belief Networks


11. **Agent Communication**: Communication as action, Types of communicating agents, A formal grammar for a subset of English

**Text Book:**

**Reference Books:**
5. Dan W. Patterson, *Introduction to Artificial Intelligence and Expert System*, PHI.
6. Efraim Turban Jay E. Aronson, "Decision Support Systems and Intelligent Systems" PHI.

**Term Work:**
Term work shall consist of at least 10 experiments covering all topics and one written test. Distribution of marks for term work shall be as follows:

1. Laboratory work (Experiments and Journal)                  15 Marks
2. Test (at least one)                                       10 Marks

The final certification and acceptance of TW ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

**Suggested Experiment list: (Can be implemented in JAVA)**
1. Problem Formulation Problems
2. Programs for Search
3. Constraint Satisfaction Programs
4. Game Playing Programs
5. Assignments on Resolution
6. Building a knowledge Base and Implementing Inference
7. Assignment on Planning and reinforcement Learning
8. Implementing Decision Tree Learner
9. Neural Network Implementation
10. Bayes’ Belief Network (can use Microsoft BBN tool)
11. Assignment on Agent Communication – Grammar Representation For Simple Domains

**ORAL EXAMINATION**

Oral examination is to be conducted based on the above syllabus.