Artificial Intelligence

BCSE-306L

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Outline

- Syllabus
- Text Books
- Course Objectives
- Course Outcomes
- Evaluation Plan (Rubrics for Assignments/Quiz/Term-Project)

Syllabus: Module 1 - Introduction (6 Hours)

- ❑Introduction and Evolution of AI
- ❑State of Art-
- ❑Different Types of Artificial Intelligence
- ❑Applications of AI
- ❑Subfields of AI
- ❑Intelligent Agents
- ❑Structure of Intelligent Agents
- ❑AI Environments

Syllabus: Module 2 - Problem Solving Based on Searching (6 Hours)

- Introduction to Problem Solving by searching Methods-State Space search
- Uninformed Search Methods
- Uniform Cost Search
- Breadth First Search
- Depth First Search
- Depth limited search
- Iterative deepening depth-first
- Informed Search Methods
- Best First Search
- A* Search

Syllabus: Module 3 – Local and Adversarial Search (5 Hours)

- Local Search algorithms
- Hill-climbing search
- Simulated annealing
- Genetic Algorithm
- Adversarial Search
- Game Trees and Minimax Evaluation
- Elementary two-players games
- tic-tac-toe
- Minimax with Alpha-Beta Pruning

Syllabus: Module 4 – Logic and Reasoning (8 Hours)

- ❑Introduction to Logic and Reasoning
- ❑Propositional Logic
- ❑First Order Logic
- ❑Inference in First Order Logic
- ❑Unification
- ❑Forward Chaining
- ❑Backward Chaining
- ❑Resolution

Syllabus: Module 5 – Uncertain Knowledge and Reasoning (5 Hours)

- ❑Quantifying Uncertainty
- ❑Bayes Rule
- ❑Bayesian Belief Network
- ❑Approximate Inference in Bayesian networks

Syllabus: Module 6 – Planning (7 Hours)

- ❑Classical planning
- ❑Planning as State-space search
- ❑Forward search
- ❑Backward search
- ❑Planning graphs
- ❑Hierarchical Planning
- ❑Planning and acting in Nondeterministic domains
- ❑Sensor-less Planning
- ❑Multiagent planning

Syllabus: Module 7 – Communicating, Perceiving and Acting (6 Hours)

- Communication
- Fundamentals of Language
- Probabilistic Language Processing
- Information Retrieval
- Information Extraction
- Perception
- Image Formation
- Object Recognition

Syllabus: Module 8 – Contemporary Issues (2 Hours)

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Text Books/ Reference Books:

- Text Books:

1. **Russell, S. and Norvig, P. 2015. Artificial Intelligence - A Modern Approach, 3rd Edition, Prentice Hall.**

- Reference Books:

1. **Alpaydin, E. 2010. Introduction to Machine Learning. 2nd Edition, MIT Press.**
2. **K.R. Chowdhary fundamentals of artificial intelligence springer 2020**

Course Objectives

1. To impart artificial intelligence principles, techniques and its history.
2. To assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving engineering problems.
3. To develop intelligent systems by assembling solutions to concrete computational problems.

Course Outcomes

1. Evaluate Artificial Intelligence (AI) methods and describe their foundations.
2. Apply basic principles of AI in solutions that require problem-solving, inference, perception, knowledge representation and learning.
3. Demonstrate knowledge of reasoning, uncertainty, and knowledge representation for solving real-world problems.
4. Analyse and illustrate how search algorithms play a vital role in problem-solving.

Evaluation Plan (Rubrics for Assignments/Quiz/Term-Project)

S.No.	Component	Modules	CO	Timeline	Date	Marks
1	Quiz	2, 3	2	Before CAT 1	03-02-2024	10
2	DA-1	4, 5	3	Between CAT-1 and CAT 2	22-03-2024	10
3	DA-2	6, 7	4	After CAT 2	24-04-2024	10

Note for Students

- This power point presentation is for lecture, therefore it is suggested that also utilize the text books and lecture notes.