

- **Sem.** : 6
- **Subject Code** : 05DS0603
- **Subject** : Artificial Intelligence
- **Course Objectives**
 - To equip with the basics of artificial intelligence and intelligent agents.
 - To make aware about various search strategies.
 - To understand knowledge representation and planning.
 - To understand the concept of learning and neural networks.
 - To acquire basic understanding of NLP, Robotics and Expert Systems.
- **Prerequisites** :

Unit No	Topics Covered	No of lectures required
1	<p>Introduction Artificial Intelligence, The foundation's of artificial intelligence, Historical backdrop, What is intelligence?, The Turing test</p> <p>Intelligent agents Agents and environments, The concept of rationality, The nature of environments, Structure of intelligent agents</p>	10

2	<p>Uninformed search strategies</p> <p>Breadth first search, Depth first search, Depth Bounded search, Depth First Iterative deepening search</p> <p>Informed search strategies</p> <p>Heuristic functions, Best first search, Hill climbing search, Iterative hill climbing, Simulated Annealing, Tabu search, Beam search, B & B search, A* search, IDA* search</p> <p>Game playing</p> <p>Games as search problems, Two person games, Minimax search, Alpha Beta pruning, Effectiveness</p>	14
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3	<p>Knowledge representation</p> <p>Representations and mappings, Approaches to knowledge representation, Propositional logic, problems with propositional logic</p> <p>First order logic</p> <p>Syntax and semantics, Extension and notation variations, Using FOL, Inference – forward and backward chaining, Resolution, completeness of resolution</p> <p>Planning</p> <p>The STRIPS domain, Forward state space planning, Backward state space planning, Goal stack planning, Plan space planning</p>	16
4	<p>Learning</p> <p>Forms of learning, Supervised learning , Learning Decision Trees, Evaluating and choosing the best hypothesis, The theory of learning, Artificial Neural Networks, Ensemble learning, Practical machine learning</p>	10
5	<p>Natural language processing</p> <p>Classical problems in NLP, Basic NLP techniques, Applications, Natural language generation</p> <p>Robotics</p> <p>Introduction, Robotic hardware, Machine learning in robot perception, Robotic software architecture</p> <p>Introduction to expert systems</p> <p>Introduction to KBES, Architecture of KBES, Case study of various KBES like MYCIN, MACSYMA, STEAMER, REACTOR</p>	10

Course Outcomes :

1. Student will be able to understand the concepts of artificial intelligence and intelligent agents.
2. Student will be able to apply search strategies.
3. Student will be able to understand knowledge representation, its approaches and planning.
4. Student will be able to understand the concept of learning, neural networks and its applications.
5. Student will be able to understand NLP, Robotics and Expert Systems.

Course Outcomes – Program Outcomes Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	L	L	L		L	M	M	M	M		H
CO2	L	H	L		L	M	H	M	M		H
CO3	M	H	M		M	L	H	M	H		M
CO4	M	M	H		L	L	H	H	L	L	M
CO5	H	H	L	L	H	L	M	L	M		H

Text Books :

1. "Artificial Intelligence – A Modern Approach", Stuart Russell and Peter Norvig, 3rd Edition, Pearson Education
2. "Artificial Intelligence", Elaine Rich and Kevin Knight, Shivashankar Nair, 3rd Edition, McGraw-Hill publication
3. "A First course in Artificial Intelligence", Deepak Khemani, McGraw Hill Education
4. "Artificial Intelligence and Expert Systems for Engineers", C. S. Krishnamoorthy, S. Rajeev, CRC press

Reference Books :

1. "Artificial Intelligence : A New Synthesis", N. J. Nilsson, Elsevier India
2. "Artificial Intelligence", G. F. Luger, Pearson Education
3. "Artificial Intelligence – A Systems Approach", M. Tim Jones, Infinity Science Press

Web References :

- 1) <https://intellipaat.com/blog/tutorial/artificial-intelligence-tutorial/>
- 2) <https://nptel.ac.in/courses/106/105/106105077/>

App References :

- 1) **Artificial Intelligence (AI) by SkedSoft**
- 2) **Artificial Intelligence Tutorial for Beginners by GZBapp**

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Book Number	Chapter Numbers
1	1	Book 1: 1.1 to 1.4, 2.1 to 2.4
2	1, 3	Book 1: 5.1,5.2,5.4 Book 3: 2.3,2.4,2.7,2.8, 3.1 to 3.3, 3.7,3.8, 4.1,4.2, 5.2,5.5,5.7
3	1, 2, 3	Book 1: 7.1 to 7.3, 9.4,9.6,9.7 Book 2: 4.1 to 4.3 Book 3: 7.1 to 7.5
4	1	18.1 – 18.5, 18.7, 18.10,18.11
5	1, 3, 4	Book 1: 25.1, 25.2, 25.7 Book 3: 16.1 to 16.4 Book 4: 3.2,3.3



**FACULTY OF COMPUTER
APPLICATIONS
B.Sc. (Data Science)**

Practical List

Note: The program can be implemented in any language as per the choice of the students. Preferred language is Python. Prolog can be used to design Rule based expert systems.

1. Implement Breadth First Search (for 8 puzzle problem).
2. Implement Breadth First Search (for Water Jug problem).
3. Implement Depth First Search (for 8 puzzle problem).
4. Implement Depth First Search (for Water Jug problem).
5. Write a program to solve Tower of Hanoi problem
6. Write a program to implement Single Player Game (Using Heuristic Function).
7. Implement Two Player Game - Tic-Tac-Toe (Using Heuristic Function).
8. Write a program to solve N-Queens problem.
9. Write a program to solve travelling salesman problem.
10. Develop any Rule based system for an application of your choice.
11. Develop an Expert system for Medical diagnosis.