

INSTITUTE	FACULTY OF COMPUTER APPLICATIONS
PROGRAM	MASTER OF SCIENCE (DATA SCIENCE)
SEMESTER	1
COURSE TITLE	ARTIFICIAL INTELLIGENCE
COURSE CODE	05MD0103
COURSE CREDITS	5

Objective:

- 1 To equip with the basics of artificial intelligence and intelligent agents.
- 2 To make aware about various search strategies.
- 3 To understand knowledge representation and planning.
- 4 To understand the concept of learning and neural networks.
- 5 To acquire basic understanding of NLP, Robotics and Expert Systems.

Course Outcomes: After completion of this course, student will be able to:

- 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.

Pre-requisite of course:NONE

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction and Intelligent agents Introduction to subject, Introduction to AI, various definitions of AI, History, Introduction to AI applications, AI techniques, Turing test, Introduction to intelligent agents, How agents should act, Structure of intelligent agents, environments	6

Contents : Unit	Topics	Contact Hours
2	Informed and uninformed search strategies and Game playing Introduction to uninformed search strategies, BFS, DFS, Depth limited search, DFID, Bidirectional search, Introduction to informed search strategies, heuristic functions , Best first search, Hill climbing search, problem of local maxima, Iterative hill climbing, , Simulated annealing, Tabu search, beam search, Branch and bound search, Comparison of BFS, B& B and A*, A* search technique ,IDA* , Introduction to game playing, Game playing as a search problem, Two person games, Minimax search , Alpha Beta – Pruning, Effectiveness of pruning, Class test - 1	16
3	Knowledge representation, FOL and planning Introduction to knowledge representation, representation and mapping, Approaches of knowledge representation, propositional logic, Problems with propositional logic, Introduction to predicate logic, Syntax, extension and notation variations, Using FOL, Inference – Forward and backward chaining, Resolution and refutation, Completeness of resolution, Introduction to planning and STRIPS domain, FSSP ,BSSP, Goal stake planning, PSP, Graph plan	13
4	Learning Introduction to learning, A general model of learning agents, Learning with decision trees, Learning in Neural networks, Perceptron, Multilayer feed forward network , Applications of neural network, Class test - 2	6
5	Natural language processing, Robotics and Expert systems Introduction to NLP, Classical problems in NLP, Basic NLP techniques, Application, Natural language generation, Introduction to robotics, Tasks, Parts, architectures, Introduction to KBES, Architecture of KBES, Case study : MYCIN, MACSYMA, Case study : STEAMOR, REACTOR	9
Total Hours		50

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	AI programs Write a program to implement Single Player Game , Write a program to implement Single Player Game (Using Heuristic Function). , Implement Two Player Game - Tic-Tac-Toe (Using Heuristic Function). , Write a program to solve N-Queens problem. , . Write a program to solve travelling salesman problem. , Develop any Rule based system for an application of your choice. , Develop an Expert system for Medical diagnosis. , Implement Breadth First Search (for Water Jug problem). , Implement Depth First Search (for Water Jug problem).	26
Total Hours		26

Textbook :

- 1 Artificial Intelligence – A Modern Approach, Stuart Russell and Peter Norvig, Pearson Education, 2010
- 2 Artificial Intelligence, Elaine Rich and Kevin Knight, Shivashankar Nair, McGraw-Hill , 2015
- 3 A First course in Artificial Intelligence, Deepak Khemani, McGraw Hill Education, 2017
- 4 Artificial Intelligence and Expert Systems for Engineers, C. S. Krishnamoorthy, S. Rajeev, CRC press, 1996

References:

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

Suggested Theory Distribution:

The suggested theory distribution as per Bloom’s taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
10.00	10.00	30.00	20.00	20.00	10.00

Instructional Method:

- 1 Powerpoint presentation
- 2 Case studies
- 3 Audio visual tutorials
- 4 Quiz

Supplementary Resources:

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