COURSE CODE	COURSE TITLE	L	T	P	C
1152CS137	ARTIFICIAL INTELLIGENCE	3	0	0	3

Course Category: Program Elective

A. Preamble :

Artificial Intelligence is one of the most advanced fields of computer science which involves use of Mathematics, Statistics, Information Technology and Information Sciences in discovering new information and knowledge from large databases and optimize Human effort overall. It is a new emerging interdisciplinary area of research and development which has created interest among scientists of various disciplines like Computer Science, Mathematics, Statistics, Information Technology.

B. Prerequisite courses:

S.No	Subject Code	Subject Name
01	1151CS102	Data Structures

C. Related Courses:

S.No.	Subject Code	Subject Name
01	1152CS124	Soft Computing
02	1152CS140	Machine Learning Techniques
03	1152CS110	Knowledge Based Decision Support Systems
04	1152CS207	Machine Learning using R

D. Course Outcomes :

Upon the successful completion of the course, students will be able to:

CO No.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
CO1	Expound the problem solving by Searching State Space.	K2
CO2	Solve Problem by Heuristic approach.	K3
CO3	Solve Problem by Random and Optimal approaches.	K3
CO4	Solving Constraint-statisfaction problem and Planning .	K3
CO5	Utilize Logical knowledge representation.	K3
CO6	Experiment with Uncertainty and Reasoning	K3

E. Correlation of COs with POs :

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H				L								M		
CO2	H	H	H										M		
CO3	H	H	M	L	L								M	L	
CO4	H	L	M	M	M	L							L	M	M
CO5	H	L	H		H						M				M
CO6	H	L	M	M	M	L							L	M	M

H- High; M-Medium; L-Low

F. Course Content :

UNIT – I Basic Search Techniques: 9

Artificial Intelligence - Introduction. **State Space Search**: Generate and Test- Simple Search- Depth First Search- Breadth First Search- Comparison of BFS and DFS- Quality of Solution- Depth Bounded DFS- Depth First Iterative Deepening.

Heuristic Search: Heuristic Functions- Best First Search- Hill Climbing- Local Maxima- Solution Space Search- Variable Neighborhood Descent- Beam Search- Tabu Search- Peak to Peak Methods.

UNIT – II Advanced search techniques: 9

Randomized Search and Emergent Systems: Iterated Hill Climbing- Simulated Annealing- Genetic Algorithms- The Travelling Salesman Problem- Neural Networks- Emergent Systems- Ant Colony Optimization. **Finding Optimal Paths**: Brute Force- Branch & Bound- Refinement Search- Dijkstra's Algorithm- Algorithm A*- Iterative Deepening A*- Recursive Best First Search.

UNIT – III Planning and Strategies 9

Planning: The STRIPS Domain- Forward and Backwards State Space Planning- Goal Stack Planning- Plan Space Planning- A Unified Planning Framework. **Constraint Satisfaction Problem**: N-Queens- Constraint Propagation- Scene Labeling- Higher Order and Directional Consistency- Algorithm Backtracking- Look-ahead Strategies- Strategic Retreat.

UNIT – IV Knowledge Representation 9

Structured Knowledge Representation: Hierarchies in Domain- The Scheme- Frames- Semantic Net- Scripts, Goals, Plans and MOPs- Inheritance in Taxonomies- Description Logics- Formal Concept Analysis- Conceptual Graphs.

UNIT – V Knowledge Facets and Logic Inferences 9

Knowledge Based Reasoning: Agents- Facets of Knowledge. **Logic and Inferences:** Formal Logic- Propositional Logic- Resolution Method in Propositional Logic- First Order Logic- Incompleteness of Forward Chaining- Resolution Refutation in First Order Logic- Deductive Retrieval – Resolution Method's Complexity in FOL- Horn Clauses and SDL Resolution- Backward Chaining- Second Order Logic.

Total : 45 Periods

G. Learning Resource

i. Text books:

1. "A First Course in Artificial Intelligence", Deepak Khemani, McGraw Hill Education, 2013.

ii. Reference books:

1. "Logic Foundations of Artificial Intelligence", Michael R. Genesereth,N.J.Nilsson, Morgan

Kaufmann Publishers, 1st Ed, 1987.

2. "Understanding Beliefs", N.j.Nilsson, MIT Press, 2014.

3. "Search in Artificial inteeligence", Kanal.L, et al, Springer-Verlag NewYork Inc.,1988.

4. "Artificial Intelligence", E. Rich and K. Knight, Mc Graw Hill Publishers Inc, 3rd Edition, 2017.

5. "Artificial intelligence P: A Modern Approach", S.J.Russell et al, PearsonEd India,3rd Ed, 2015.

iii. Online Resources:

1. https://i4iam.files.wordpress.com%2F2013%2F08%2Fartificial-intelligence-by-rich-and-knight.pdf&usg=AOvVaw2A8-1FYIVizB7m-RiVXjhQ
2. https://nptel.ac.in/courses/109101003
3. https://nptel.ac.in/courses/109101004