

SHORT SYLLABUS

BCSE306L Artificial Intelligence (3-0-0-3)

Introduction- Intelligent Agents- Problem Solving based on Searching- Informed Search Methods- Local Search and Adversarial Search – Logic and Reasoning- Uncertain Knowledge and Reasoning-Planning-Learning from Data-Applications in Artificial Intelligence.

BCSE306L	Artificial Intelligence	L	T	P	C
		3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			
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					
On completion of this course, student should be able to:					
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					
Module:1	Introduction	6 hours			
Introduction- Evolution of AI, State of Art -Different Types of Artificial Intelligence- Applications of AI-Subfields of AI-Intelligent Agents- Structure of Intelligent Agents- Environments					
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					
Module 3	Local Search 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.					
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.					
Module:5	Uncertain Knowledge and Reasoning	5 hours			
Quantifying Uncertainty- Bayes Rule -Bayesian Belief Network- Approximate Inference in Bayesian networks					
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					
Module:7	Communicating, Perceiving and Acting	6 hours			
Communication-Fundamentals of Language -Probabilistic Language Processing -Information Retrieval- Information Extraction-Perception-Image Formation- Object Recognition.					
Module:8	Contemporary Issues	2 hours			
		Total Lecture hours:			45 hours
Text Book					
1.	Russell, S. and Norvig, P. 2015. Artificial Intelligence - A Modern Approach, 3 rd Edition, Prentice Hall.				

Reference Books			
1.	K. R. Chowdhary, Fundamentals of Artificial Intelligence, Springer, 2020.		
2	Alpaydin, E. 2010. Introduction to Machine Learning. 2 nd Edition, MIT Press.		
Mode of Evaluation: CAT, Assignment, Quiz, FAT			
Recommended by Board of Studies		04-03-2022	
Approved by Academic Council		No. 65	Date 17-03-2022