

Course Code	Course Title	L	T	P	C
BACSE206	Foundations of Artificial Intelligence	3	1	0	4
Pre-requisite	NIL	Syllabus Version			
		1			
Course Objectives					
To provide a foundational understanding of the principles, techniques and approaches used in Artificial Intelligence (AI). To develop an understanding of reasoning and knowledge representation based on mathematical logic. To equip with techniques for solving complex problems using search algorithms and probabilistic reasoning in the context of modern AI advancement.					
Course Outcomes					
Demonstrate the fundamental components of an AI system, such as agents, environments and problem-solving architectures. Analyze and illustrate the significance of search algorithms in problem-solving. Apply logic-based methods for representing knowledge and drawing inferences in AI systems. Design appropriate reasoning frameworks for various real-world AI scenarios. Design and evaluate planning systems that incorporate constraints related to time, schedules and resource management.					
Module:1	Introduction to Artificial Intelligence	6 hours			
Artificial and Natural Intelligence - History of AI - Applications of AI - Types of AI- Intelligent Agents - Nature of Environment - Structure of Agents – Classification of Agents - Designing Agents - Agent Architectures - Autonomous and Multi-Agent Systems.					
Module:2	Problem Solving by Search	13 hours			
State Space Search - Uninformed Search Strategies - Breadth First Search , Depth First Search , Iterative Deepening , Bi-directional , Uniform Cost - Heuristic - Informed Search Strategies, Greedy Best First , A* Search, Iterative Deepening A* Search - Adversarial Search - Minimax Algorithm, Alpha-Beta Pruning - Constraint Satisfaction Problem - Local Search Algorithms - Hill-climbing, Simulated Annealing, Genetic algorithms - Problems involving Search - Board Games, Graph Colouring Problem- Job-Shop Scheduling- Travelling Salesman Problem					
Module:3	Knowledge Representation and Inference	8 hours			

Knowledge Based Systems - Propositional Logic - Syntax, Semantics, Inference - Forward Chaining(FC) - Backward Chaining(BC) - Modus Ponens(MP) - First-Order Predicate Logic - Syntax, Semantics, Inference - Unification, FC, BC, MP, Horn Clause, Resolution by Refutation - Problems on Inference - Knights and Knaves, Curiosity-Cat problem		
Module:4	Reasoning under Uncertainty	8 hours
Uncertainty - Representation, Basic Probability Notation, Probability axioms, Full Joint Distributions, Conditional Independence, Bayes' Rule, Anterior and Posterior Probabilities and its Use - Bayesian Belief Networks – Exact Inference- Approximate Inference - Problems involving Uncertainty- Coloured Ball Problem - Burglar / Earthquake Alarm Problem		
Module:5	Automated Planning	8 hours
Classical Planning - Algorithms for Classical Planning - Heuristics for Planning - Hierarchical Planning - Planning graphs, Planning in Nondeterministic Domains - Time, Schedules and Resources- Analysis of Planning Approaches- Problems in Planning- Blocks World Problem – Tour Planning problem.		
Module:6	Contemporary Issues	2 hours
Total Lecture Hours:		45 hours
Tutorial Hours:		15 hours
Text Book(s)		
Stuart J. Russell and Peter Norvig, " Artificial Intelligence: A Modern Approach ", Pearson, 4 th Edition, 2022		
Reference Books		
David L. Poole and Alan K. Mackworth, " Artificial Intelligence: Foundations of Computational Agents ", Cambridge University Press, 3 rd Edition, 2023 Deepak Khemani , " A First Course in Artificial Intelligence ", Tata McGraw Hill Education, 1 st Edition, 2013		
Mode of Evaluation :Continuous Assessment Test, Digital Assignment, Quiz, Final Assessment Test, Seminar, Group Discussion, Presentation		
Recommended by Board of Studies :		21-05-2025
Approved by Academic Council : No. 78		12-06-2025