

Semester: VI				
Programme : B.Sc. Computer Science (Hons)				
Course : ARTIFICIAL INTELLIGENCE				
Paper code: C3CS230622T / C3CS230622P				Credits: 4
Hours/week : Theory: 3 / Practical 2				
Category: Core/MDC/SEC/VAC : Core				
Theory / Practical / Composite : Composite				
No of Modules : 1				
<p>Course Overview: This course introduces the fundamental concepts and techniques of Artificial Intelligence, focusing on how intelligent systems represent knowledge, reason, learn, and solve problems. It covers state-space problem formulation, uninformed and informed search strategies, heuristic techniques, game-playing algorithms, and knowledge representation using logic and semantic networks. The course also explores agent-based systems and examines the ethical and social implications of AI, providing students with a solid foundation to understand, design, and evaluate intelligent systems and their real-world applications.</p>				
Course Outcome:				
<p>1. CO1 (Remember / Understand): Explain the fundamental concepts, background, applications of Artificial Intelligence, and the role of intelligent agents.</p>				
<p>2. CO2 (Understand / Apply): Formulate AI problems using state-space representation and apply uninformed and informed search techniques, including heuristic-based methods, to solve problems.</p>				
<p>3. CO3 (Apply / Analyze): Analyze problem characteristics and implement advanced problem-solving techniques such as A*, AO*, Constraint Satisfaction Problems, and problem-reduction methods.</p>				
<p>4. CO4 (Apply / Evaluate): Apply and evaluate game-playing strategies using Minimax and Alpha–Beta pruning, and represent knowledge using logical and semantic network-based approaches.</p>				
<p>5. CO5 (Evaluate): Assess the ethical, social, and professional implications of Artificial Intelligence and the importance of responsible and trustworthy AI systems.</p>				
Prerequisites: Discrete Structures				
SYLLABUS				
UNIT/Module	CONTENT	HOURS or NUMBER OF CLASSES	CO Mapping	COGNITIVE LEVEL
I.	Introduction to Artificial Intelligence, Background, Applications, Turing Test	5	CO1	Remember (K1), Understand (K2)
II.	State Space Search, Production Systems, Problem Formulation, Uninformed Search (BFS, DFS)	8	CO2	Understand (K2), Apply (K3)
III.	Problem Characteristics, Heuristic Search, A*, AO*, CSP, Means–End Analysis	10	CO2, CO3	Apply (K3), Analyze (K4)
IV.	Game Playing, Minimax Algorithm, Alpha–Beta Pruning	5	CO4	Apply (K3), Evaluate (K5)
V.	Knowledge Representation (FOPL, Resolution, Unification, Semantic Nets), Agent-Based Systems	8	CO4	Understand (K2), Apply (K3), Analyze (K4)
VI.	Ethical and Social Issues in Artificial Intelligence	3	CO5	Evaluate (K5)

Text Books		
1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Pearson Education, 2006.		
2. Elaine Rich and Kelvin Knight, Artificial Intelligence, Tata McGraw Hill, 2002.		
3. Nils J Nilson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann Publishers, Inc., San Francisco, California, 2000.		
Suggested readings		
1. R. Akerkar, Introduction to Artificial Intelligence, Prentice-Hall of India, 2005		
2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Prentice Hall of India, 2006.		
3. Ivan Bratko, Prolog Programming for Artificial Intelligence, Pearson, 2018.		
Web Resources		
1. An Introduction to Artificial Intelligence, IIT Delhi, Prof. Mausum https://nptel.ac.in/courses/106102220		
Evaluation	Theory CIA: 12 Attendance: 3 Semester Exam: 45	Practical CA: 38 Attendance: 2
Paper Structure for Theory Semester Exam Module : Answer 3 out of 5 of 15 marks each		

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive levels
CO1	Explain the fundamental concepts, background, and applications of Artificial Intelligence and intelligent agents.	Remember (K1), Understand (K2)
CO2	Formulate AI problems using state-space representation and apply uninformed and informed search techniques to solve them.	Understand (K2), Apply (K3)
CO3	Analyze problem characteristics and apply advanced problem-solving techniques such as A*, AO*, Constraint Satisfaction Problems, and problem-reduction methods	Apply (K3), Analyze (K4)
CO4	Apply and evaluate game-playing strategies using Minimax and Alpha-Beta pruning, and represent knowledge using logical and semantic network approaches.	Apply (K3), Evaluate (K5)
CO5	Assess the ethical, social, and professional implications of Artificial Intelligence and the need for responsible AI practices.	Evaluate (K5)