

Year: B. Tech III (Semester VI)

Subject Name: Introduction to Artificial Intelligence

Subject Code: BTIT15601

Type of course: Open Elective Course

Prerequisite (if any): Data Structures, Mathematics

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	0	3	60	25	15	0	0	100

CA1: Continuous Assessment (assignments / projects / open book tests / closed book tests) CA2: Sincerity in attending classes / class tests / timely submissions of assignments / self-learning attitude / solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work / Quality of work submitted / Active participation in lab sessions / viva on practical skills learned in course.

Contents:

Sr. No.	Contents	Total Hrs
1.	Introduction to AI : Introduction to Artificial Intelligence (AI), typical AI problems, history of AI, Turing test, Popular AI applications	03
2.	Problem Representation and State Space Search – Defining a problem as state space search, Example problems: Water Jug Problem, 8-puzzle, 8-queens problem, Tower of Hanoi problem, Tic-Tac-Toe, Missionary Cannibal, Production systems, Problem characteristics	04
3.	Search strategies: Uninformed Search: Breadth-first search, Depth-first search, Heuristic function, Greedy-Best-First Search, A* Search, Hill-climbing search, limitation of hill climbing search, solving constraint satisfaction problems	08
4.	Game Playing: Overview, Multiplayer game environments, zero-sum games, minimax tree (or game tree), the minimax-algorithm, Alpha-beta pruning	04
5.	Knowledge presentation and Reasoning: Knowledge representation - Issues and Approaches; Propositional logic, Inference and Deduction, Predicate logic, Unification, Resolution by refutation, Forward and Backward Reasoning, Logic Programming	08
6.	Probabilistic and Statistical Reasoning: The Basic Probability notation, inference using full joint distributions, Independence, Bayes' Rule and its Use, the semantics of Bayesian Networks	06
7.	Learning: Supervised and Unsupervised Learning, decision trees, regression and classification models, Artificial neural networks, reinforcement learning	06
8.	Perception and Robotics: Image formation, image-processing operations, object representation and recognition, Using vision for manipulation and navigation, speech	06

	recognition, Robot Hardware :Sensors, Effectors, actuator, Applications- Industry and Agriculture, Transportation, Robotic cars, health care etc;	
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Suggested Specification table with Marks (Theory): (For B. Tech only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	30	15	0	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom’s Taxonomy)

Reference Books:

Sr No.	Title of book /article	Author(s)	Publisher and details like ISBN
1.	Artificial Intelligence	Elaine Rich And Kevin Knight	Tata McGraw-Hill
2.	Artificial Intelligence: A Modern Approach (Third Edition)	Stuart J. Russell, Peter Norvig	Pearson

Note: Students should refer to the latest editions of books

Course Outcomes:

Sr. No.	CO statements	Marks % weightage
CO-1	Analyse the characteristics of any complex problem formulate the problem as state space search.	15%
CO-2	Apply different uninformed, heuristic search and adversarial techniques to solve to various real time problems.	25%
CO-3	Examine knowledge representation issues, reasoning, formulate predicates-rules, Apply reasoning approaches to handle uncertain knowledge for real life problem solving	30%
CO-4	Describe different learning techniques in Problem solving	15%
CO-5	Describe AI technique like perception, vision, speech recognition in Robotics environment	15%

List of Open learning website:

- NPTEL online course: An Introduction to Artificial Intelligence (<https://nptel.ac.in/courses/106102220>)