



**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)**

(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.
PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in



COURSE PLAN (2025-2026 EVEN SEMESTER)

Course Code/Name	U23AIT41 / ARTIFICIAL INTELLIGENCE			
Year/Section/Department	II / A / AI&DS			
Credits Details	L:3	T:0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I	INTELLIGENT AGENTS	9
Introduction to AI – Agents and Environments – concept of rationality – nature of environments – structure of agents. Problem solving agents – search algorithms – uninformed search strategies.		
UNIT II	PROBLEM SOLVING	9
Heuristic search strategies – heuristic functions. Local search and optimization problems – local search in continuous space – search with non-deterministic actions – search in partially observable environments – online search agents and unknown environments.		
UNIT III	GAME PLAYING AND CSP	9
Game theory – optimal decisions in games – alpha-beta search – monte-carlo tree search – stochastic games – partially observable games. Constraint satisfaction problems – constraint propagation – backtracking search for CSP – local search for CSP – structure of CSP.		
UNIT IV	LOGICAL REASONING	9
Knowledge-based agents – propositional logic – propositional theorem proving – propositional model checking – agents based on propositional logic. First-order logic – syntax and semantics – knowledge representation and engineering – inferences in first-order logic – forward chaining – backward chaining – resolution.		
UNIT V	PROBABILISTIC REASONING	9
Acting under uncertainty – Bayesian inference – naïve Bayes models. Probabilistic reasoning – Bayesian networks – exact inference in BN – approximate inference in BN – causal networks.		

Objective:

The main learning objective of this course is to prepare the students

- ❖ To learn the basic AI approaches
- ❖ To develop problem solving agents
- ❖ To perform logical reasoning
- ❖ To perform probabilistic reasoning
- ❖ To learn the Bayesian networks

Text Book:

T1. Stuart Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2021.

T2. Bratko, Prolog: Programming for Artificial Intelligence, Fourth edition, AddisonWesley Educational Publishers Inc., 2011.

Reference Book:

R1. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2007

R2. Kevin Night, Elaine Rich, and Nair B., “Artificial Intelligence”, McGraw Hill, 2008

R3. Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006

R4. Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013.

Website:

W1: https://stanford-cs221.github.io/autumn2024//?utm_source=chatgpt.com

W2: <https://www.cs.rutgers.edu/academics/undergraduate/course-synopses/course-details/01-198-440-introduction-to-artificial-intelligence>

Online Mode of Study (if Any):

NPTEL details can be listed.

- ❖ <https://nptel.ac.in/courses/106/105/106105077/>

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I INTELLIGENT AGENTS						
1	Introduction to AI	T1	1-5	BB	1	1
2	Definition of AI	T1, R2	5-16	BB	1	2
3	Agents and Environments	T1	17-22	BB	1	3
4	Concept of Rationality	T1	23-27	BB	1	4
5	Nature of Environments	T1, R2	28-32	BB	1	5
6	Structure of Agents	T1	33-37	BB	1	6
7	Problem Solving Agents	T1, R3	38-43	PPT	1	7
8	Search Algorithms	T1, R4	44-48	BB	1	8
9	Uninformed Search Strategies	T1	49-53	BB	1	9
Outcome of Unit I:						
CO1 : Explain intelligent agent frameworks						
UNIT II PROBLEM SOLVING						
10	Introduction to Heuristic Search Strategies	T1	54-56	BB	1	10
11	Advanced Heuristic Search Strategies	T1	57-60	BB	1	11
12	Heuristic Functions	T1	61-63	BB	1	12
13	Local Search and Optimization Problems	T1	64-67	BB	1	13
14	Local Search in Continuous Space	T1	68-70	PPT	1	14
15	Search with Non-Deterministic Actions	T1, R2	71-73	BB	1	15
16	Search in Partially Observable Environments	T1, R3	74-76	BB	1	16
17	Introduction to Online Search Agents	T1	77-80	PPT	1	17
18	Online Search Agents in Unknown Environments	T1, R4	81-84	BB	1	18
Outcome of Unit II:						
CO2 : Apply problem solving techniques .						
UNIT III GAME PLAYING AND CSP						

19	Game Theory and Optimal Decisions in Games	T1, R3	85-90	BB	1	19
20	Alpha-Beta Search	T1,W1	91-95	BB	1	20
21	Monte-Carlo Tree Search	T1	96-100	PPT	1	21
22	Stochastic Games	T1, R4	101-105	BB	1	22
23	Partially Observable Games	T1	106-110	BB	1	23
24	Introduction to Constraint Satisfaction Problems	T1	111-115	BB	1	24
25	Constraint Propagation	T1, R2	116-120	BB	1	25
26	Backtracking Search for CSP	T1	121-125	BB	1	26
27	Local Search for CSP and Structure of CSP	T1, R3	126-130	BB	1	27
Outcome of Unit III:						
CO3: Apply game playing and CSP techniques						
UNIT IV LOGICAL REASONING						
28	Knowledge-Based Agents	T1	131-135	BB	1	28
29	Propositional Logic	T1, R3	136-140	BB	1	29
30	Propositional Theorem Proving	T1	141-145	BB	1	30
31	Propositional Model Checking	T1	146-150	PPT	1	31
32	Agents Based on Propositional Logic	T1,W2	151-155	BB	1	32
33	First-Order Logic – Syntax and Semantics	T1	156-160	BB	1	33
34	Knowledge Representation and Engineering	T1, R2	161-165	BB	1	34
35	Inferences in First-Order Logic	T1	166-170	PPT	1	35
36	Forward Chaining – Backward Chaining – Resolution	T1, R4	171-175	BB	1	36
Outcome of Unit IV:						
CO4: Perform logical reasoning						
UNIT V PROBABILISTIC REASONING						
37	Introduction to Acting Under Uncertainty	T1	176-178	BB	1	37

38	Advanced Concepts in Bayesian Inference	T1	179-181	BB	1	38
39	Naïve Bayes Models and Applications	T1	182-184	BB	1	39
40	Introduction to Probabilistic Reasoning	T1	185-187	BB	1	40
41	Bayesian Networks Overview	T1	188-190	BB	1	41
42	Exact Inference in Bayesian Networks	T1	191-193	BB	1	42
43	Approximate Inference Techniques in BN	T1, R3	194-196	BB	1	43
44	Understanding Causal Networks	T1	197-199	BB	1	44
45	Applications of Causal Networks	T1	200-202	BB	1	45
Outcome of Unit V: CO5: Perform probabilistic reasoning under uncertainty. CO6: Apply the rules to obtain the Inference						

Course Outcome:

At the end of course:(Consolidated outcome)

The students would be able to

- CO1 : Explain intelligent agent frameworks
- CO2 : Apply problem solving techniques
- CO3: Apply game playing and CSP techniques
- CO4: Perform logical reasoning.
- CO5: Perform probabilistic reasoning under uncertainty.
- CO6: Apply the rules to obtain the Inference

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	3	3	-	-	-	-	-	-	-	2	2	2	2
CO 2	3	3	1	-	-	-	-	-	-	-	2	2	2	2
CO 3	3	3	1	-	-	-	-	-	-	-	2	2	2	2
CO 4	3	3	1	-	-	-	-	-	-	-	2	2	2	2
CO 5	3	3	1	-	-	-	-	-	-	-	2	2	2	2
CO 6	3	3	1	-	-	-	-	-	-	-	2	2	2	2
AVG	3	3	1	-	-	-	-	-	-	-	2	2	2	2

[Levels of correlation: 3 (High), 2 (Medium), 1(Low)]

Content Beyond Syllabus:

- ❖ Deep Reinforcement Learning (DRL)

Internal Evaluation Components:

Webportal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment – I (60)	Unit I and II	CO 1 & CO2
	1	Assignment –I Handwritten (20)	1. Define an agent. Explain the four basic agents that embody the principles underlying intelligent systems with examples. 2. List some environmental properties that are important for intelligent agents. 3. Describe the properties of the environment for the Mars Rover.	
	2	Assignment – II Poster Presentation / PPT (20)	1. Discuss all the Local Search algorithms with examples. 2. Discuss on online search agents with example. 3. Explain about PEAS for an automated Bill paying system.	
Webportal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Assignment – III Seminar (20)	1. Describe how the minimax and alpha-beta algorithms change for two-player, non-zero-sum games in which each player has a distinct utility function and both utility functions are known to both players. If there are no constraints on the two terminal utilities, is it possible for any node to be pruned by alpha-beta? What if the player's utility functions on any state differ by at most a constant k, making the game almost cooperative? 2. Discuss on Knowledge representation and engineering.	
	4	Assignment – IV Case Study Report (20)	1. Differentiate backward and forward chaining with example. 2. What are partially observable games? How are they solved in a deterministic environment?	
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6

	5	Assignment – V MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

Google Class Code Details:

Class Name: II AI&DS A SEC

Link: <https://classroom.google.com/c/NjQ4OTU1OTgyOTAx?cjc=262g4iu>

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1												
AT-2												
MODEL												

Prepared By

Verified By

Approved By

Principal