



Question Bank

Details of the Course

Academic Year	: 2025 – 2026
Regulation	: 2024
Name of the Department	: Artificial Intelligence and Machine Learning
Name of the Course	: Artificial Intelligence
Course Code	: AM242302
Semester	: III
Common To Programme(s)	: AI&DS, AIML

Course Outcome: (List the Course Outcomes of the Course)

At the end of this course, the students will be able to

CO1: Explain intelligent agent frameworks.

CO2: Apply different search strategies to solve a problem.

CO3: Apply game playing and CSP techniques.

CO4: Perform Logical reasoning.

CO5: Perform probabilistic reasoning under uncertainty.

Bloom's Level: BL1-Remembering, BL2-Understanding, BL3-Appling, BL4-Analyzing, BL5-Evaluating, BL6-Creating.

UNIT- I – Introduction to AI

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	PART – A (2 Marks)	Bloom's Level	Course Outcome	Marks Allotted
1.	State the definition of Artificial Intelligence.	[BL1]	[CO1]	[2]
2.	Name the elements of an agent.	[BL2]	[CO1]	[2]
3.	List down the characteristics of intelligent agent.	[BL2]	[CO1]	[2]
4.	How would you quote PEAS description? Give the example of PEAS description for automated taxi driver.	[BL3]	[CO1]	[2]
5.	Define agents, agent functions	[BL1]	[CO1]	[2]
6.	Explain Task Environment.	[BL2]	[CO1]	[2]
7.	Define problem solving agents.	[BL1]	[CO1]	[2]
8.	Write the ways to formulate the problem.	[BL2]	[CO1]	[2]
9.	Discover what is the importance of optimal solution?	[BL2]	[CO1]	[2]
10.	How to improve the effectiveness of search-based problem solving techniques?	[BL3]	[CO1]	[2]
Descriptive Questions (13/15 Marks)				
1.	i. Is AI a science or is it engineering? Or neither or both? Explain. ii. Describe about future of AI.	[BL4] [BL2]	[CO1]	[7+6]
2.	i) List out the four categories of AI in detail. ii) Explain the properties of task environment.	[BL2]	[CO1]	[7+6]

3.	Define agents. Specify the PEAS descriptions for intelligent agent design with examples and explain basic types of agents.	[BL2]	[CO1]	[13]
4.	Explain the structure of different Intelligence agents and how these agents are converted to learning agents.	[BL4]	[CO1]	[13]
5.	For each of the following agents, develop a PEAS description of the task environment. <ul style="list-style-type: none"> Robot Soccer Player Internet book shopping agent Autonomous mars over Mathematician's theorem proving assistant 	[BL4]	[CO1]	[13]
6.	Illustrate on problem formulation for Toy and Real world problems with example.	[BL4]	[CO1]	[13]
7.	List the characteristics of artificial intelligence. List any five characteristics in detail.	[BL3]	[CO1]	[15]
8.	i) Briefly describe the components of problem definition with an example ii) Explain in detail the concept of Rationality.	[BL3]	[CO1]	[8+7]
9.	i) State about the characteristics of problem. ii) Discuss about the concept of searching for solutions.	[BL2]	[CO1]	[7+8]
10.	Define a problem and its components. Explain how a problem solving agent works?	[BL3]	[CO1]	[15]

UNIT- II – PROBLEM SOLVING

	PART – A (2 Marks)	Bloom's Level	Course Outcome	Marks Allotted
1.	What is heuristic search?	[BL1]	[CO2]	[2]
2.	Differentiate Informed & Uninformed search. Give examples.	[BL2]	[CO2]	[2]
3.	What do you infer from hill-climbing search algorithm?	[BL2]	[CO2]	[2]
4.	Point out the purpose of online search agent in unknown environment?	[BL3]	[CO2]	[2]
5.	How the search technique is made efficient in continuous space?	[BL3]	[CO2]	[2]
6.	List the performance measures of search strategies.	[BL1]	[CO2]	[2]
7.	What is the advantage of heuristic function?	[BL2]	[CO2]	[2]
8.	Generalize and define the effect of heuristic accuracy on performance.	[BL3]	[CO2]	[2]
9.	Why problem formulation must follow goal formulation?	[BL2]	[CO2]	[2]
10.	Show the significance of using heuristic functions.	[BL3]	[CO2]	[2]

Descriptive Questions (13/15 Marks)

1.	Explain heuristic informed search strategies with an example.	[BL4]	[CO2]	[13]
2.	What is uninformed search and explain the different types of uninformed search strategies.	[BL3]	[CO2]	[13]
3.	Sketch with an example, what is the need of online search agents and unknown environments.	[BL6]	[CO2]	[13]
4.	Describe the A* search and give the proof of optimality of A*.	[BL3]	[CO2]	[13]
5.	How an algorithm's performance is evaluated? Compare different uninformed search strategies in terms of the four evaluation criteria.	[BL4]	[CO2]	[13]
6.	Elaborate the following local search strategies with examples. <ul style="list-style-type: none"> i) Genetic Algorithms ii) Simulated Annealing iii) Local Beam Search 	[BL3]	[CO2]	[13]
7.	Illustrated about the search with non deterministic actions and in	[BL5]	[CO2]	[15]

	partially observable environment.			
8.	Sketch with an example, what is the need of online search agents unknown environment.	[BL6]	[CO2]	[15]
9.	Briefly explain the following: i) Local search in continuous space ii) search with non-deterministic actions.	[BL3]	[CO2]	[15]
10.	Elaborate on search in partially observable environment.	[BL3]	[CO2]	[15]

UNIT- III – GAME PLAYING AND CSP

	PART – A (2 Marks)	Bloom's Level	Course Outcome	Marks Allotted
1.	State optimal decisions in game.	[BL3]	[CO3]	[2]
2.	Explain the classification of CSP with respect to constraints	[BL5]	[CO3]	[2]
3.	Define node consistency.	[BL1]	[CO3]	[2]
4.	Which algorithm is used in the game to make decision?	[BL4]	[CO3]	[2]
5.	How tree decomposition is achieved?	[BL2]	[CO3]	[2]
6.	Give the example for game playing problems.	[BL3]	[CO3]	[2]
7.	Define conflict direct back jumping.	[BL1]	[CO3]	[2]
8.	What is cycle cutset?	[BL1]	[CO3]	[2]
9.	Define Alpha beta pruning	[BL2]	[CO3]	[2]
10.	What is stochastic games?	[BL2]	[CO3]	[2]

Descriptive Questions (13/15 Marks)

1.	Explain Mini-max algorithms and how it works for game of tic-tac-toe.	[BL4]	[CO3]	[13]
2.	i. What is the significance of pruning system? Explain alpha and beta pruning? ii. Elaborate about Game playing with Alpha-Beta Pruning and its Algorithm.	[BL3]	[CO3]	[7+6]
3.	How do you take optimal decisions in single player and multiplayer games describe in detail.	[BL3]	[CO3]	[13]
4.	Write a simple backtracking algorithm for constraint satisfaction problems.	[BL3]	[CO3]	[13]
5.	Elaborate on backtracking search and Local search of CSP with algorithm.	[BL5]	[CO3]	[13]
6.	What is partially observable game and explain with an example.	[BL2]	[CO3]	[13]
7.	Define constraint satisfaction problem (CSP). How CSP is formulated as a search problem? Explain with an example. (or) Explain in detail about constraint satisfaction problem with an example.	[BL3]	[CO3]	[15]
8.	Explain with examples: (i) Constraint graph (ii) Crypt arithmetic problem (iii) Adversarial search problem	[BL3]	[CO3]	[15]
9.	Discuss on stochastic games and monte carlo tree search algorithms with example in detail.	[BL4]	[CO3]	[15]
10.	Sketch the structure of problem using CSP? Is the problem structure influence on the solving technique?	[BL6]	[CO3]	[15]

UNIT- IV – LOGICAL REASONING

	PART – A (2 Marks)	Bloom's Level	Course Outcome	Marks Allotted
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1.	Explain three levels of knowledge based agent with an example.	[BL2]	[CO4]	[2]
2.	What is entailment?	[BL1]	[CO4]	[2]
3.	Define inference.	[BL1]	[CO4]	[2]
4.	List some of the rules of inference.	[BL3]	[CO4]	[2]
5.	Convert the following into Horn clauses. $\forall x: \forall y: \text{cat}(x) \vee \text{fish}(y) \rightarrow \text{likes} - \text{to} - \text{eat}(x, y)$	[BL3]	[CO4]	[2]
6.	Write the following in predicate logic: For all x and y if x is a parent of y then y is a child of x.	[BL4]	[CO4]	[2]
7.	For the given sentence “All pompeians were Romans” write a well formed formula in predicate logic.	[BL1]	[CO4]	[2]
8.	What is clausal form? How is it useful?	[BL2]	[CO4]	[2]
9.	State generalized modus ponens.	[BL2]	[CO4]	[2]
10.	What is the need of arc consistency?	[BL4]	[CO4]	[2]

Descriptive Questions (13/15 Marks)

1.	Elaborate about Forward chaining and Backward chaining with an example.	[BL5]	[CO4]	[13]
2.	Describe the steps involved in the knowledge engineering process with example ?	[BL2]	[CO4]	[13]
3.	Describe a procedure for converting a sentence to CNF with an example.	[BL3]	[CO4]	[13]
4.	Write short notes on Unification algorithm with example.	[BL2]	[CO4]	[13]
5.	Develop and Illustrate the use of first order logic to represent knowledge.	[BL5]	[CO4]	[13]
6.	Explain resolution in predicate logic with suitable example.	[BL4]	[CO4]	[13]
7.	List out and explain each step to convert first order logic sentences to normal form. What is the use of doing that?	[BL3]	[CO4]	[15]
8.	Consider the following sentences: i) John likes all kinds of food ii) Apples are food iii) Chicken is food iv) Anything anyone eats and isn't killed by is food v) Bill eats peanuts and is still alive vi) Sue eats everything Bill eats Translate these sentences into predicate form and Convert the formulas of part into clause form?	[BL6]	[CO4]	[7+8]
9.	(i) Define the syntactic elements of First-Order logic (ii) Give resolution proof for example problem statement :(a) “West is a criminal” (8) (b) Curiosity killed the cat.	[BL5]	[CO4]	[8+7]
10.	Describe the resolution in FOL and Explain the Steps for resolution ?	[BL4]	[CO4]	[15]

UNIT- V –PROBABLISTIC REASONING

	PART – A (2 Marks)	Bloom's Level	Course Outcome	Marks Allotted
1.	Define Bayes theorem.	[BL1]	[CO5]	[2]
2.	List down the applications of Bayesian network.	[BL2]	[CO5]	[2]
3.	When the joint probability is required?	[BL2]	[CO5]	[2]
4.	When the leak nodes are generated in the conditional distribution?	[BL4]	[CO5]	[2]
5.	Define random variable and its types.	[BL2]	[CO5]	[2]

6.	Differentiate conditional and unconditional probability.	[BL2]	[CO5]	[2]
7.	Give the Baye's rule equation.	[BL4]	[CO5]	[2]
8.	List the different models in probabilistic reasoning.	[BL3]	[CO5]	[2]
9.	Define fuzzy reasoning.	[BL2]	[CO5]	[2]
10.	Define the term decision theory.	[BL2]	[CO5]	[2]
Descriptive Questions (13/15 Marks)				
1.	How the uncertainty issues are generated in the real world?	[BL3]	[CO5]	[13]
2.	Discuss about Bayesian theory and Bayesian network.	[BL2]	[CO5]	[13]
3.	Explain the semantics of Bayesian network with example in detail.	[BL4]	[CO5]	[13]
4.	How to represent knowledge in an uncertain domain	[BL4]	[CO5]	[13]
5.	How the uncertainty issues are generated in the real world?	[BL3]	[CO5]	[13]
6.	Explain how Bayesian statistics provides reasoning under various kinds of uncertainty	[BL4]	[CO5]	[13]
7.	Write the enumeration algorithm for answering queries on Bayesian networks.	[BL5]	[CO5]	[15]
8.	Describe a method for constructing Bayesian networks.	[BL3]	[CO5]	[15]
9.	Explain about the exact inference in Bayesian networks.	[BL3]	[CO5]	[15]
10.	i. Define the term: Query variable, evidence variable ad hidden variable ? ii. Write a explanation of casual networks?	[BL2]	[CO5]	[7+8]

Course Coordinator
Name & Designation

Head of the Department

PRINCIPAL