

A. Course General Information:

Course Code:	CSE422
Course Title:	Artificial Intelligence
Credit Hours (Theory + Lab):	3 + 1.5
Contact Hours (Theory + Lab):	3 + 3
Category:	Program Elective
Type:	Theory, Lecture + Lab
Prerequisites:	CSE221: Algorithms
Co-requisites:	None

B. Course Catalog Description (Content): Concepts of artificial intelligence, rationality, intelligent agents and their structures. Problem representation; task environments, search strategies, rule chaining, inference and learning in intelligent systems; systems of general problem solving, game playing, expert consultation, recognition, understanding and translation. Use of heuristic vs. algorithmic programming; cognitive simulations- vs. machine intelligence; study of some expert systems such as robotics and understanding. Solving problems in AI language.

C. Course Objective:

- I. Introduce the concept of Artificial Intelligence, rationality.
- II. Analyze different problem-solving strategies for informed, uninformed problems, deterministic or stochastic games.
- III. Present different algorithms and the analysis of complexity, optimality and completeness of these algorithms.
- IV. Develop the critical skill to formulate problems and strategies to solve problems.
- V. Introduce the concept of uncertain knowledge and probabilistic reasoning.
- VI. Introduce probabilistic and logic models so the students will be able to use these models in various decision-making problems.
- VII. Introduce the concept of Green and Responsible AI to enforce ethical usage of Artificial Intelligence.
- VIII. Introduce the basic concept of machine learning.

D. Course Outcomes (COs):

Upon successful completion of this course, students will be able to

Sl.	CO Description	Weightage (%)
1.	Apply different search algorithms to solve agent-based problems and play games	45
2.	Apply different probabilistic and logical theories to solve problems	25
3.	Apply machine learning pipeline to design and develop solutions of practical regression and classification problems.	25
4.	Assess the sustainability impact of machine learning and/or AI solutions in the context of environment and society.	2
5.	Demonstrate awareness of ethical implications and responsible use of Artificial Intelligence by analyzing and discussing real-world AI applications with respect to bias, transparency, and accountability.	1.5
6.	Analyze the societal and legal implications of deploying AI solutions and assess the responsibilities of an engineer in ensuring safety, fairness, and compliance with regulatory frameworks.	1.5

E. Mapping of CO-PO-Taxonomy Domain & Level- Delivery-Assessment Tool:

Sl.	CO Description	POs	Bloom's taxonomy domain/level	Delivery methods and activities	Assessment tools
1	Apply different search algorithms to solve agent-based problems and play games	e	Cognitive	Lecture, Lab	Assignment / Lab / Mid
2	Apply different probabilistic and logical theories to solve problems	d	Cognitive / Affective	Lecture, Lab	Assignment/ Final
3	Apply machine learning pipeline to design and develop solutions of practical regression and classification problems.	l	Cognitive / Affective / Psychomotor	Lecture, Lab	Lab / Final
4	Assess the sustainability impact of machine learning and/or AI solutions in the context of environment and society.	g	Cognitive / Affective	Lecture, Lab	Project Report / Assignment
5	Demonstrate awareness of ethical implications and responsible use of Artificial Intelligence by analyzing and discussing real-world AI applications with respect to bias, transparency, and accountability.	h	Cognitive / Affective	Lecture, Lab	Project Report / Assignment

6	Analyze the societal and legal implications of deploying AI solutions and assess the responsibilities of an engineer in ensuring safety, fairness, and compliance with regulatory frameworks.	f	Cognitive / Affective	Lecture, Lab	Project Report / Assignment
---	---	---	-----------------------	--------------	-----------------------------

F. Course Materials:

i. Text and Reference Books:

Sl .	Title	Author(s)	Publication Year	Edition	Publisher	ISBN
1	Artificial Intelligence A Modern Approach	Stuart Russel, Peter Norvig	1995	Third	Pearson Education	978-0-13-604259-4

G. Lesson Plan:

No	Topic	Week/Lecture#	Related CO (if any)
1	Introduction to Artificial Intelligence	Week 1/ Lecture 1	CO1
2	Properties of Agents	Week 2/ Lecture 2, 3	CO1
3	Solving Problems by Searching	Week 3/ Lecture 4, 5	CO1
4	Beyond Classical Search 1	Week 4/ Lecture 6, 7	CO1
5	Beyond Classical Search 2	Week 5/ Lecture 8, 9	CO1
6	Beyond Classical Search 3	Week 6/ Lecture 10, 11	CO1
7	Adversarial Search	Week 7/ Lecture 12, 13	CO1
Midterm			
7	Learning from Examples 1	Week 9/ Lecture 14, 15	CO2
8	Quantifying Uncertainty	Week 10/ Lecture 16, 17	CO2
9	Probabilistic Reasoning	Week 11/ Lecture 18, 19	CO2
10	Bayesian Networks	Week 12/ Lecture 20, 21	CO3
11	Green and Responsible AI	Week 13/ Lecture 22, 23	CO4, CO5, CO6
12	Learning from Examples 2	Week 14/ Lecture 24, 25	CO3

(Lab component)

No	Topic	Week/Lecture#	Related CO (if any)
1	Solving Problems by Searching	Week 2/ Lecture 1	CO1
2	Beyond Classical Search	Week 3/ Lecture 2	CO1
3	Beyond Classical Search 2	Week 4 / Lecture 3	CO1
4	Adversarial Search	Week 5/ Lecture 4	CO1
5	Machine Learning Basics	Week 6/ Lecture 5	CO3
Midterm			
6	Data Cleaning/Processing	Week 8/ Lecture 6	CO3
7	Regression Analysis	Week 9/ Lecture 7	CO3
8	Naive Bayes	Week 10/ Lecture 8	CO3
9	Learning from Examples	Week 11/ Lecture 9	CO3
10	Project/Presentation	Week 12, 13/ Lecture 10, 11	CO3

H. Assessment Tools:

Assessment Tools	Weightage (%)
Quiz	15
Assignment	5
Lab	25
Midterm	25
Final	30

I. CO Assessment Plan:

Assessment Tools	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
Assignment	✓	✓		✓	✓	✓
Lab	✓		✓			
Midterm	✓					
Final		✓	✓			

J. CO Attainment Policy: As per the course outcome attainment policy of the Department of Computer Science and Engineering.

K. Grading policy: As per the grading policy of the Department of Computer Science and Engineering.

L. Course Coordinator:

Md. Tanzim Reza
Senior Lecturer
Department of Computer Science and Engineering