

<b>Course Title and Code: Artificial Intelligence (CS1224)</b>		
Hours per Week	<b>L-T-P: 3-0-2</b>	
Credits	<b>4</b>	
Students who can take	<b>B.Tech. V Semester</b>	
Prerequisites	<b>Data Structures</b>	
<b>Course Objective:</b> This course discusses the origin and evolution of the field of Artificial Intelligence, failures, successful applications and philosophical foundations. This course will cover state of the art topics in AI as covered in various universities throughout the world. It will cover the basics of uninformed search, A* search and heuristics, constraint satisfaction problems, minimax, expectimax, probabilistic decision making using Bayes Net, Reinforcement learning.		
<b>Learning Outcome:</b> On successful completion of this course, the students should be able to:  CS1224.1 Identify problems that are amenable to solution by AI methods.  CS1224.2 Reason about the state-space search algorithm to use under different problem specific conditions.  CS1224.3 Implement two player games like Tic-tac-toe.  CS1224.4 Apply Markov decision process and reinforcement learning in real-life applications. CS1224.5 Design and code solutions to a wide variety of artificial intelligence problems where the machine can learn from the world and act accordingly.		
<b>Evaluation Scheme</b>		
<b>Sr. No</b>	<b>Specifications</b>	<b>Marks</b>
01	Attendance	5
02	Assignment	NIL
03	Class Participation	NIL
04	Quiz	NIL
05	Theory Exam-I	15
06	Theory Exam-II	20
07	Theory Exam-III	35
08	Report	NIL
09	Report-II	NIL
10	Report-III	NIL
11	Project	25
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I	NIL

15	Lab Evaluation-II	NIL
16	Course Portfolio	NIL
17	Presentation	NIL
18	Viva	NIL
	<b>Total (100)</b>	<b>100</b>

### Course Contents:

**Unit I:** Introduction to Artificial Intelligence, History and Philosophy of AI, Intelligent Agents, Classical AI problems, Problem Spaces and Problem Analysis.

**Unit II:** Solving problems by Searching, Uninformed search (DFS/BFS), Informed Search/Heuristics based search techniques, Generate and test, hill climbing, best first search. Adversarial Search.

**Unit III:** Graph Pruning, Min-Max Algorithm, Alpha-Beta Pruning. Game Trees. Constraint Satisfaction Problems.

**Unit IV:** Markov Decision Processes. Introduction to Reinforcement Learning.

**Unit V:** Knowledge Reasoning and Planning, Logical Agents, First-Order Logic, Bayes Nets, Representation, Independence, Inference, Sampling.

### Text Book:

There is no text book for the course. However, the following serves as a good reference:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Fourth Edition, Pearson Education, 2022.

### Reference Online Course:

**CS188 Fall 2022 – UC Berkley: Artificial Intelligence.**

Online available at: <https://inst.eecs.berkeley.edu/~cs188/fa18/>

Course Outcomes	CORRELATION WITH PROGRAM OUTCOMES																CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2a	2b	2c	3a	3b	3c	4a	4b	4c	5a	5b	6	7a	7b		1	2
CS1224.1	1		1	1		2		2				1					2	2
CS1224.2						1					1	2		1	1		1	1
CS1224.3	2	1		1			1		2		2	2		3			3	3
CS1224.4	2	1	1	1	2	3	3		2	1	2	1	1	2	3			3
CS1224.5	2		1					3	3		3	1		3			3	2

Sl.No.	LA	Evaluation component used	CO
LA.1	Getting started with AI and Python.	Lab evaluation	CS1224.1 CS1224.2
LA.2	Implementing A*	Lab evaluation, Project	CS1224.1 CS1224.2 CS1224.3
LA.3	Implementing a two player game.	Lab evaluation, Project	CS1224.3 CS1224.4
LA.4	Implementing Reinforcement Learning	Lab evaluation, Project	CS1224.3 CS1224.4 CS1224.5

### Learning Activity Articulation Matrix: (Mapping of LAs with COs)

#### Learning Activities (LA):

Sl.No.	CS1224.1	CS1224.2	CS1224.3	CS1224.4	CS1224.5
LA.1	2	2			
LA.2	1	2	3		
LA.3			3	2	
LA.4			1	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation