Programme: B. Tech. (CSE)	Course Title: Artificial Intelligence			Course Code: CSE-328
Type of Course: Program Core	Prerequisites: Data Structures and Algorithms, Discrete Mathematical Structures, Probability and Statistics			Total Contact Hours: 40
Year/Semester: 3/Odd	Lecture Hrs/Week: 3	Tutorial Hrs/Week: 0	Practical Hrs/Week: 0	Credits: 3

Learning Objective:

The course aims to provide a broad introduction to the field of artificial intelligence, its philosophical foundations, success and failures. intelligent entities. The topics include problem solving in AI, knowledge representation, reasoning, learning, and planning to understand the ways to make computers intelligent in problem solving. The course will help the students in formulating the solutions to different categories of problems in artificial intelligence through the case studies in different fields.

Course outcomes (COs):

On completion of this course, the students will be able to:		Bloom's Level
CO-1	**Relate** the role of agents in identifying the problems that are amenable to solutions by AI methods.	2
CO-2	**Apply** the various knowledge representation techniques to represent contextual and semantic-oriented information efficiently.	3
CO-3	**Analyze** probabilistic solutions to implement decision-making in different fields of AI.	4
CO-4	**Evaluate** the significance of planning and learning in the development of intelligent systems.	5
CO-5	**Construct** the solution methodologies for the real-world problems by identifying the applications and challenges in AI.	3

Course Topics	Lecture Hours	Associated CO
UNIT – I (Introduction)	**10**	**CO1**
1.1 Introduction to AI, history and philosophical foundations, Agents and Environment.	**2**	
1.2 Problem solving, Examples of problems, Blind Search: Depth first search, Breadth first search and their variants; Informed search: Uniform cost search, heuristic function, hill climbing, best first search, A* and AO* search.	**4**	
1.3 Basic concepts of constraint satisfaction problem, constraint optimization problem, evaluation function; Game trees, Mini-Max search, Expectimax, alpha-beta pruning.	**4**	

UNIT – II (Knowledge Representation)	**10**	**CO2**
2.1 Introduction to KR, Knowledge Agents, Predicate logic, and resolution.	**3**	
2.2 Rule based system, forward reasoning and conflict resolution, backward reasoning and its use; Introduction Fuzzy logic.	**3**	
2.3 Structured KR: semantic nets – slot and inheritance, frames – exceptions and default attached predicates; introduction to ontology in AI, description logics.	**4**	
UNIT – III (Probabilistic Reasoning)	**10**	**CO3**
3.1 Handling uncertainty: sources of uncertainty; Probabilistic inference: conditional, marginal, joint distribution; Markov Model, Hidden Markov Model, Partially Observable MDP.	**5**	
3.2 Bayes' rule, Naïve Bayes and its limitations, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer theory.	**5**	
UNIT-IV (Learning and Planning)	**7**	**CO4**
4.1 Learning: introductory concepts, learning model, supervised and unsupervised learning, examples of learning: introduction to reinforcement learning and neural networks.	**4**	
4.2 Planning: the planning problem, planning with state space search, planning graphs, planning example – partial-order planning, block world.	**3**	
UNIT-V (Applications)	**3**	**CO5**
5.1 Introduction to AI languages; Case Studies of AI applications to real-world problems.	**3**	

Textbook References:

Textbook:

1. Stuart Russell and Peter Norvig, *Artificial Intelligence – A Modern Approach*, 3rd Edition, Pearson Education, 2009.
2. Dan W. Patterson, *Introduction to Artificial Intelligence and Expert Systems*, Prentice Hall of India.
3. Elaine Rich and Kevin Knight, *Artificial Intelligence*, 3rd Edition, Tata McGraw Hill, 2017.

Reference books:

1. Nils J. Nilsson, *The Quest for Artificial Intelligence*, Cambridge University Press. 2009.
2. P.H. Winston, *Artificial Intelligence*, 3rd Edition, Addison-Wesley Publishing Company, 1993.
3. Deepak Khemani, *A First Course in Artificial Intelligence*, 1st Edition, McGraw-Hill Education, 2013.
4. George F. Lugar, *Artificial Intelligence – Structures and Strategies for Complex Problem Solving*, 5th Edition, Pearson Education Limited, 2005.
5. Ben Coppin, *Artificial Intelligence Illuminated*, 1st Edition, Jones and Bartlett Publishers, 2004.

Evaluation Method		
Item	**Weightage (%)**	**Associated CO**
Quiz	20	CO1, CO3
Assignment/Project	10	CO5
Midterm	30	CO1, CO2
Final Examination	40	CO1, CO2, CO3, CO4, CO5

*Please note, as per the existing institute's attendance policy the student should have a minimum of 75% attendance. Students who fail to attend a minimum of 75% lectures will be debarred from the End Term/Final/Comprehensive examination.

CO and PO Correlation Matrix (CSE)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1							1	3	1	1
CO2	3	2	2	1	2								3	2	2
CO3	3	3	3	3	1								3	2	2
CO4	3	2	3	2	2								3	3	3
CO5	3	3	3	3	3	1	1	1	1	1		2	2	3	3

CO and PO Correlation Matrix (B.Tech. – M.Tech. Integrated Dual Degree (CSE))

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1							1	3	1	1
CO2	3	2	2	1	2								3	2	2
CO3	3	3	3	3	1								3	2	2
CO4	3	2	3	2	2								3	3	3
CO5	3	3	3	3	3	1	1	1	1	1		2	2	3	3

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