UTA027 ARTIFICIAL INTELLIGENCE

	L	T	P	Cr
	3	0	2	4.0

Course Objectives: To be familiar with basic concepts of artificial intelligence and its applications in various industries.

Overview: Foundations, scope, problems, and approaches of AI.

Problem-solving through Search: Forward and backward, state-space, blind, heuristic, problem-reduction, A, A*, AO*, minimax, constraint propagation, stochastic, and evolutionary search algorithms, sample applications.

Knowledge Representation and Reasoning: Ontologies, foundations of knowledge representation and reasoning, representing and reasoning about objects, relations, events, actions, time, and space; predicate logic, situation calculus, description logics, reasoning with defaults, reasoning about knowledge, sample applications.

Neural network and machine learning basics: Need and types of neural networks, Neural network representation and working, activation functions, applications of neural networks, introduction to machine learning.

Computer vision basics: Fundamentals of image processing, introduction to computer vision and its distinctness from image processing, challenges in computer vision, applications of computer vision.

Applications: Application of Artificial Intelligence in areas like healthcare, gaming, finance, robotics, automotive industry, agriculture, e-commerce, etc. Case study of chatbots.

Laboratory work:
Implement various artificial intelligence techniques studied during the course using Python libraries.

Course outcomes:
After the completion of the course, the student will be able to:
1. Comprehend the basics of Artificial Intelligence and representing various problem domains using knowledge representation schemes.
2. Apply various artificial intelligence techniques for obtaining solutions to real-life problems.
3. Understand the fundamentals of neural networks, machine learning, and computer vision.
4. Comprehend the applicability of Artificial Intelligence techniques in real world.

Text Books:
1. *Rich E., Knight K. and Nair B. S., Artificial Intelligence, Tata McGraw Hills (2009) 3rded.*
2. *Luger F. G., Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education Asia (2009) 6thed.*
3. *Vijayvargia A., Machine Learning with Python, BPB Publication (2018).*
4. *Forsyth, A., D. and Ponce, J., Computer Vision: A Modern Approach, Pearson Education (2012) 2nd Edition.*

Reference Books:
1. *Patterson W. D., Introduction to Artificial Intelligence and Expert Systems, Pearson (2015) 1sted.*
2. *Russel S., Norvig P., Artificial Intelligence: A Modern Approach, Prentice Hall (2014) 3rded.*
3. *Bishop M., C., Pattern Recognition and Machine Learning, Springer-Verlag (2011) 2nd Edition.*
4. *Gonzalez, C., R. and Woods, E., R. Digital Image Processing, Addison- Wesley (2018) 4th Edition.*
5. *Hartley, R. and Zisserman, A., Multiple View Geometry in Computer Vision Cambridge University Press (2003) 2nd Edition.*