

Short Syllabus

BECE309L

Artificial Intelligence and Machine Learning

(3-0-0-3)

Foundations of AI - Agents and rationality, Agent Architecture Types; Problem-solving by Searching - Search algorithms, strategies; Knowledge Representation - Agents based on Propositional Logic; Probability reasoning and uncertainty - Knowledge representation in uncertainty, Decision making; Data Preparation for Machine Learning - Data Cleaning, Integration, Transformation; Learning from Examples - Forms of Learning, Regression, Decision Trees, Ensemble Learning; Deep Learning - Convolutional Networks, Recurrent Neural Networks.

Course Code	Course Title	L	T	P	C
BECE309L	Artificial Intelligence and Machine Learning	3	0	0	3
Pre-requisite	BMAT201L	Syllabus version			
		1.0			
Course Objectives					
1. To get acquainted with different types of intelligent agents. 2. To understand the importance and significance of Machine learning. 3. To preface the essentials of Deep Learning.					
Course Outcome					
At the end of the course, students will be able to 1. Comprehend different intelligent agents and its variants. 2. Solve the real-world problem using the various search algorithms. 3. Infuse various symbolic knowledge representation. 4. Employ intelligent agents for decision making. 5. Handle real-time issues using various learning methodologies. 6. Apply deep learning algorithms for solving real-world problems.					
Module:1	Foundations of AI	4 hours			
Introduction – Agents and rationality – Task environment – Agent Architecture Types.					
Module:2	Problem-solving by Searching	7 hours			
Search Space – Search algorithms, strategies – Search in complex environments.					
Module:3	Knowledge Representation	6 hours			
Knowledge-based agents, Agents based on Propositional Logic – First-order logic.					
Module:4	Probability reasoning and uncertainty	6 hours			
Quantifying uncertainty, Knowledge representation in uncertainty, Decision making – Simple, complex.					
Module:5	Data Preparation for Machine Learning	4 hours			
Basics of Vectors & Matrices – Overview: Data Cleaning, Integration, Transformation & Reduction.					
Module:6	Learning from Examples	9 hours			
Forms of Learning – Dimensionality reduction - Regression – Statistical Methods: Naïve-Bayes, Nearest Neighbor, Decision Trees – Random Forest, Clustering, Ensemble Learning, Case studies – Machine Learning in Signal Processing, Intelligent Antenna.					
Module:7	Deep Learning	7 hours			
Simple Feed Forward Networks – Computational graphs for Deep Learning – Convolutional Networks – Recurrent Neural Networks – Kernel Machines – Hidden Markov Models.					
Module:8	Contemporary issues	2 hours			
		Total Lecture hours:		45 hours	
Text Book(s)					
1.	Stuart J Russell, Peter Norwig, Artificial Intelligence – A modern approach, 2015, 3 rd edition, Pearson, India.				
Reference Books					
1.	Vinod Chandra S.S, Anand Hareendran S., Artificial Intelligence: Principles and				

	Applications, 2020, 2 nd Edition, PHI Learning Pvt. Ltd., India.		
2.	Alpaydin et al., Introduction to Machine Learning, 2019, 3 rd edition, PHI Learning Pvt. Ltd., India.		
Mode of Evaluation: Continuous Assessment Test, Digital Assignment, Quiz and Final Assessment Test			
Recommended by Board of Studies		14-05-2022	
Approved by Academic Council		No. 66	Date 16-06-2022