

Course Code	Course Title	L	T	P	C
OLMDS603	Machine Learning	3	1	0	4
Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives:					
1. To understand the basic building blocks and general principles that allow one to design machine learning algorithms					
2. To become familiar with specific, widely used machine learning algorithms					
3. To learn methodology and tools to apply machine learning algorithms to real data and evaluate their performance					
4. To adapt or combine some of the key elements of existing machine learning algorithms to design new algorithms as needed.					
Course Outcomes:					
1. Good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity etc.					
2. Analyze the strengths and weaknesses of many popular machine learning approaches.					
3. Ability to recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.					
4. Understand how to perform evaluation of machine learning algorithms and model selection					
5. Design and Implement various deep learning models for a range of real-world applications using open source tools.					
Module:1 Machine Learning Foundations					
Introduction of machine learning and its Applications, Model Evaluation and Validation, Training and Testing Models, Evaluation Metrics.					
Module:2 Supervised Learning					
Perceptron, Neural Networks, Support Vector Machines, Ensemble of Learners.					
Module:3 Bayesian Decision Theory					
Classification, Losses and Risks, Discriminant Functions, Utility Theory, Association Rules					
Module:4 Unsupervised Learning					
Clustering: k-means, adaptive hierarchical clustering, Gaussian mixture model					
Module:5 Reinforcement Learning					
Elements of RL, Types of RL Environment, RL platforms, Applications of RL					
Module:6 Deep Learning Fundamentals					
Artificial Neurons, ANNs, Deep Diving into ANN, Neural Networks in TensorFlow, RNN, CNN					
Module:7 Combining Multiple Learners					
Rationale, Generating Diverse Learners, Model Combination Schemes, Voting, Error-Correcting Output Codes, Bagging, Boosting					
Module:8 Contemporary Issues					
Total Lecture hours:				120 hours	
Text Book(s)					

1. Ethem Alpaydi, Introduction to Machine Learning, Second Edition, The MIT Press, 2015. 2. Bharath Ramsundar and Reza Bosagh Zadeh, TensorFlow for Deep Learning, O'Reilly Publications, 2018.			
Reference Books			
1. Russell and Norvig, Artificial Intelligence, Third Edition, Prentice Hall, 2015 2. Sudharsan Ravichandran, Reinforcement Learning with Python: Master reinforcement and deep reinforcement learning using OpenAI Gym and TensorFlow, Packt Publishers, 2018.			
Mode of Evaluation: Quizzes, Assignments, Projects			
Recommended by Board of Studies	27-07-2022		
Approved by Academic Council	No. 67	Date	08-08-2022