SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

Year: B. Tech IV (Semester VII)

Subject Name: Introduction to Machine Learning **Subject Code:** BTIT15702
Type of course: Open Elective Course
Prerequisite (if any): -

Rationale: Machine Learning is the study of algorithms that can learn and improve automatically with experience. This course provides knowledge to students regarding important concepts in Machine Learning including designing a learning system, hypothesis evaluation and algorithms for supervised and un-supervised learning. It also introduces students to diverse case studies and real-world applications of Machine Learning including autonomous driving, chatbots, document classification, face recognition etc.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	0	3	60	25	15	0	0	100

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests) CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Contents:

Sr. No.	Contents	Total Hours
1.	**Introduction** Introduction to Learning, Hypothesis Space, Inductive Learning Hypothesis, Hypothesis evaluation; Data Sampling, Choosing and representing the Target Function and its approximation; Issues in Machine Learning	12
2.	**Classification and Prediction** Supervised v/s Un-supervised Learning, Bayesian Classification, Rule-based Classification, Linear Regression, Evaluating the Accuracy of a Classifier	08
3.	**Clustering** Cluster Analysis; Partition-based clustering, K-means algorithm; Hierarchical clustering – Agglomerative and Divisive Hierarchical Clustering; Outlier Detection	08
4.	**Deep Learning** Perceptron, Topology of Artificial Neural Networks, Multilayer Feed-forward Neural Network, Backpropagation algorithm, Convolutional Neural Networks, Autoencoders	07

5.	**Case Studies and Applications of Machine Learning** Chatbots, Self Driving Cars, Document Classification, Face Recognition, Medical Diagnosis, Stock Market Prediction, Recommendation Systems, Virtual Try On	10

Suggested Specification table with Marks (Theory): (For B. Tech only)

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	20	10	10	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (Revised Bloom's Taxonomy)

Reference Books:

Sr no	**Title of book /article**	**Author(s)**	**Publisher and details like ISBN**	**Year of publication**	**Publication Edition**
1	Machine Learning	Tom M. Mitchell	McGraw Hill		
2	Machine Learning: The Art and Science of Algorithms that Make Sense of Data	Peter Flach	Cambridge University Press		
3	Data Mining: Concepts and Techniques	Jiawei Han and Micheline Kamber	Morgan Kaufmann		

Course Outcomes (CO):

Sr. No.	**CO statements**	**Marks % weightage**
CO-1	Formulate well-posed learning problems	10%
CO-2	Describe various issues in machine learning	20%
CO-3	Explain machine learning methods useful for generating models from data	40%

CO-4	Apply suitable machine learning algorithms to solve real world problems	30%

List of Open learning websites:

- NPTEL course on: Introduction to Machine Learning (https://nptel.ac.in/courses/106106139)