GANPAT UNIVERSITY

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications	**Branch/Spec.**	Computer Application
Semester	II	**Version**	1.0.0.0
Effective from Academic Year	2024-25	**Effective for the batch Admitted in**	June 2024
Subject Code	P12A4ML1	**Subject Name**	Machine Learning-I

Teaching scheme						**Examination scheme (Marks)**			
(Per week)	**Lecture (DT)**		**Practical (Lab.)**		**Total**		**CE**	**SEE**	**Total**
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	0	4	0	6	Practical	20	30	50

Objective:

- To understand the students how machine learning is useful in solving real world problems.
- To understand how to build and evaluate Models for different classification problems.

Pre-requisites:

- A sound knowledge of basic mathematics concepts to implement in software or systems.

Course Outcomes :

- **1 = Slight (Low); 2 = Moderate (Medium); 3 = Substantial (High); "-" = No Correlation**

Name of CO	**Description**
CO1	Explain and differentiate Machine Learning paradigms for regression, classification, and clustering tasks.
CO2	Apply statistical and probabilistic techniques to analyze and interpret datasets.
CO3	Develop and evaluate regression-based Machine Learning models using Python.
CO4	Design, implement, and assess decision tree models using Gini and Entropy criteria.

Mapping of CO and PO								
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	2	-	-	-	1
CO2	3	3	1	2	-	-	-	1
CO3	2	3	2	3	1	-	1	1
CO4	2	3	3	3	1	-	1	1

Content:

Unit	SECTION I	Hrs
1	**Overview of Machine Learning:** Introduction to Machine Learning, Types of Machine Learning: Supervise Learning, Unsupervised Learning, Reinforcement Learning, concepts of regression, classification, clustering	6
2	**Statistical Learning** ● Measures of Central Tendency in Data ● Measures of Dispersion ● Understanding Skewness in Data ● Probability Theory ● Probability Distributions ● Hypothesis Testing	8
	SECTION II	
3	**Machine Learning Techniques I** **Regression Analysis** Introduction to Analytics and Machine Learning, Framework for developing Machine Learning Models, Applications of Machine learning, Python libraries suitable for Machine Learning, Supervised Learning Algorithms with applications in Predictive Analytics, building a Simple Regression Model, Model Diagnostics, Making prediction and Measuring Accuracy, Developing multiple linear regression model using Python, Making prediction on the Validation Set., Performance measures, Confusion matrix, accuracy. Error rate, Type-I error, Type-2 error, Sensitivity, Specificity, Precision, ROC curve, AUC.	8
4	**Machine Learning Techniques II** **Decision Trees** Classification and Regression Tree, Cost Based Splitting Criteria, Decision tree learning, Splitting the dataset, Building Decision Tree Classifier using Gini Criteria, Measuring Test Accuracy, Displaying the tree, Understanding Gini Impurity, Building Decision Tree using Entropy criteria, Finding Optimal criteria and Max depth, Benefits of Decision Tree.	8

Practical Content:	
List of programs specified by the subject teacher based on above mentioned topics.	
Text Books:	
1	Kumar, U. D. (2017). Business Analytics: The Science of Data-driven Decision Making. Wiley India.
2	Kumar, U.D et al. machine Learning Using Python. Wiley India 2019.
Reference Books:	
1	Carbonell, J. G., Michalski, R. S., & Mitchell, T. M. (1983). An overview of machine learning. In Machine learning (pp. 3-23). Morgan Kaufmann.
2	Peter Harrington Machine learning in action. Manning Publications Co.1st Edition 2012.
3	Tom M. Mitchell. Machine Learning 1st Edition McGraw Hill Education 2017.
MOOC/Certification Courses:	
1	https://nptel.ac.in/courses/106106202
2	https://www.edx.org/
3	https://www.vlab.co.in/
4	https://www.coursera.org/learn/machine-learning
5	https://www.udacity.com/course/intro-to-machine-learning--ud120
6	Machine Learning with Python: A Practical Introduction by IBM
Question Paper Scheme:	

University Examination Duration: 3 Hours

Note for Examiner: -

(I) Questions 1 and 4 are compulsory with no options.

(II) Internal options should be given in questions 2, 3, 5 and 6.

SECTION – I

Q.1 –8 Marks

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks