GANPAT UNIVERSITY

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications	**Branch/ Spec.**	ComputerApplication
Semester	III	**Version**	1.0.0.0
Effective from Academic Year	2023-24	**Effective for the batch Admitted in**	June 2022
SubjectCode	P13A5ML2	**SubjectName**	Machine learning-II

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

Objective:

- To Understand the students the role of supervised learning.
- To Understand forecasting methods in machine learning.
- To Understand how to apply unsupervised learning in machine learning.
- To learn various advanced machine learning methods.

Pre-requisites:

- Basic Knowledge of Statistics and Programming Language

Course Outcomes :

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

Name of CO	**Description**
CO1	Apply supervised learning concepts to develop and evaluate logistic regression models for classification.
CO2	Analyze time-series data and apply appropriate forecasting techniques, including ARIMA models.
CO3	Implement clustering algorithms and evaluate cluster quality using similarity and dissimilarity measures.
CO4	Develop and compare advanced machine learning models using gradient descent, cross-validation, and ensemble methods.

	Mapping of CO and PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	3	-	-	-	1
CO2	3	2	1	2	-	-	-	1
CO3	2	3	1	3	-	-	-	1
CO4	3	3	2	3	1	1	-	2

Content:

Unit	SECTION I	Hrs
1	**Introduction to Supervised Learning:** Introduction to Analytics and Machine Learning, Why Machine Learning? Framework for developing Machine Learning Models Introduction to Binary Logistic Regression, Estimation of Parameters in Logistic Regression, Interpretation of Logistic Regression Parameters, Logistic RegressionModel Diagnostics, Classification Table, Optimal Cut-Off Probability, Variable selection inLogistic Regression, Application of Logistic Regression.	7
2	**Forecasting Techniques:** Introduction to Forecasting, Time Series Data and Components of Time-Series data, Forecasting techniques and Forecasting Accuracy, Moving Average Method, Single Exponential Smoothing,Double Exponential Smoothing, Triple Exponential Smoothing, Regression Model for Forecasting, Auto-Regressive(AR), Moving average(MA), and ARMAModels, Auto-Regressive Integrated Moving Average(ARIMA) Process	8
	SECTION II	
3	**Introduction to Unsupervised Learning Algorithms** Introduction to unsupervised learning, Introduction to Clustering, Distance and Dissimilarity measures used in Clustering, Euclidean distance, Standardized Euclidean distance, Manhattan distance, Minkowski distance, Jaccard Similarity Coefficient, Cosine similarity, Gower'sSimilarity coefficient, Quality and Optimal number of clusters, clustering algorithms, K-Means clustering and Hierarchical clustering.	6
4	**Advanced Machine Learning** How Machines Learn? Gradient Decent Algorithm, Developing a Gradient Descent algorithm for Linear Regression Model, Scikit-Learn library for Machine Learning, Steps for buildingMachine learning models, Bias-variance Trade-off, K-fold cross validation, advancedRegression Models, Advanced Machine Learning Algorithms, dealing with Imbalanced datasets,K-Nearest Neighbours(KNN) algorithm, Introduction to ensemble methods, Introduction toEnsemble methods, Random Forest algorithm, Building and evaluating Random Forest algorithm, Boosting algorithm, Model building using Adaboost and Gradient Boosting algorithm.	9

PracticalContent:

List of programs specified by the subject teacher based on above mentioned topics.

TextBooks:

1	Kumar, U. D. (2017). Business Analytics: The Science of Data-driven Decision Making. Wiley India.
2	Kumar, U.D Machine Learning Using Python. Wiley India.

ReferenceBooks:

1	Tom M. Mitchell. Machine Learning,McGraw Hill Education 1st Edition 2017.
2	Sebastian Raschka and Vahid Mirjalili. Python Machine Learning,Publisher : Ingram short title; 2nd edition (1 January 2017).
MOOC/CertificationCourses:	
1	https://nptel.ac.in/courses/106106202
2	https://www.edx.org/
3	https://www.vlab.co.in/
4	Machine Learning A To Z || Complete Course by Andrew Ng || Beginner to Advance ML https://www.youtube.com/watch?v=PPLop4L2eGk&list=PLLssT5z_DsK-h9vYZkQkYNWcItqhlRJLN
QuestionPaperScheme:	

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