

CBBCS SCHEME

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MMC201

Second Semester MCA Degree Examination, June/July 2026 Machine Learning and Data Analytics using Python

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	Differentiate between supervised, unsupervised, and reinforcement learning.	6	L2	CO1
	b.	List any four applications of Machine Learning and briefly explain them.	4	L2	CO1
	c.	Apply your understanding of Machine Learning to summarize its importance in real-world domains like healthcare, e-commerce, and education with suitable examples.	6	L3	CO1
	d.	List any two commonly used functions from each of the following Python libraries: NumPy, Pandas, and Matplotlib. Describe the purpose of each function with a simple example.	4	L2	CO1
OR					
Q.2	a.	How can you use Matplotlib to visualize data in Python? Describe the steps involved and mention any two common types of charts used in data analysis.	8	L2	CO1
	b.	Apply data preprocessing techniques to explain how you would clean a dataset with null values and duplicate rows.	8	L3	CO1
	c.	Discuss your understanding of scaling methods to state one difference between Min-Max Scaling and Standardization.	4	L2	CO1
Module – 2					
Q.3	a.	What is polynomial regression? How is it different from linear regression?	8	L2	CO2
	b.	Describe the role of MAE, MSE, and RMSE in evaluating regression models. Or Compare the evaluation metrics MAE, MSE, and RMSE. Write a program that shows how these metrics vary for a sample prediction.	12	L2	CO2
OR					
Q.4	a.	Explain the working principle of K-Nearest Neighbors (KNN).	10	L2	CO2
	b.	Explain the concept of cross-validation and why it is used.	10	L2	CO2

Module – 3

Q.5	a.	What is clustering in machine learning? Explain how K-Means clustering works. What is the use of the K value, and how can we check if the clustering is good?	10	L2	CO3
	b.	What is Market Basket Analysis? How is the Apriori algorithm applied in this context, and why is it useful for understanding customer purchase patterns?	10	L2	CO3

OR

Q.6	a.	Explain the purpose of Principal Component Analysis (PCA).	5	L2	CO3
	b.	What is Linear Discriminant Analysis (LDA) and how is it different from PCA?	5	L2	CO3
	c.	Explain the working of the Apriori algorithm with an example. How are frequent item sets and association rules generated using this algorithm?	10	L2	CO3

Module – 4

Q.7	a.	Apply your understanding of ensemble learning and explain how Bagging and Boosting improve model performance.	10	L3	CO4
	b.	Explain how Support Vector Machines (SVM) can be used for both linear and non-linear classification.	10	L2	CO4

OR

Q.8	a.	Illustrate Convolutional Neural Network (CNN) with an example. Explain the use of its main layers.	10	L3	CO4
	b.	Explain the steps involved in building and training a neural network using TensorFlow and Keras.	10	L2	CO4

Module – 5

Q.9	a.	Write Python code to show any two common data visualization techniques used in EDA.	10	L2	CO5
	b.	Explain the use of ARIMA in time series forecasting.	10	L3	CO5

OR

Q.10	a.	Discuss the key components of time series data (trend, seasonality, noise). How are these components handled in forecasting models?	10	L2	CO5
	b.	How would you deploy a machine learning model after training? Explain why deployment is important and mention two tools you can use for this purpose.	10	L2	CO5
