

2125
B.Sc. Data Analytics (FYUP)
Third Semester
Paper: Introduction to Machine Learning

Time allowed: 3 Hours

Max. Marks: 90

NOTE: Attempt five questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question each from Unit I - IV.

x-x-x

Unit I

- I. (a) Trace the history of Machine Learning.
(b) Explain the applications of Machine Learning in Finance and Retail (9, 9)
- II. (a) Name and differentiate different types of Machine learning. Give applications of each type.
(b) What are the ethical considerations and privacy concerns in Machine Learning? How can they be minimized? (9, 9)

Unit II

- III. (a) What is Feature Selection? Explain the different techniques of Feature Selection.
(b) What is a Feature? Explain the different aspects of Feature Engineering. (9, 9)
- IV. (a) Explain the concept of Feature Extraction and its popular algorithms.
(b) What is overfitting and underfitting in the context of Machine Learning Models? Why does it happen? (9, 9)

Unit III

- V. (a) Define Linear Regression using a graph explaining slope and intercept. Explain with suitable examples.
(b) What is Logistic Regression? Explain the assumptions and limitations of Logistic Regression. (9, 9)
- VI. (a) Explain the Random Forest Model in detail. Also explain its features.
(b) Explain the SVM model in detail with different scenarios. (9, 9)

Unit IV

- VII. (a) What is k-means Clustering? Write the main features of Clustering techniques.
(b) What is Hierarchical Clustering? How does it work? Explain with suitable examples. (9, 9)
- VIII. (a) What is Principal Component Analysis? When is it used? Explain with a suitable example.
(b) Define precision, recall and F1-score. Explain their use in model evaluation. (9, 9)

Unit V

- IX. Write short answers.
- What is Supervised Learning? Why is it called so?
 - Give three examples of classification problems.
 - What is cross-validation and why is it used?
 - Why is k-NN algorithm called a lazy learner?
 - What is the primary goal of dimensionality reduction?
 - What is the use of ROC curves?
- (6X3)

x-x-x