UNIT-1

1. Discuss various types of machine learning with examples.

2. Explain various types of supervised learning techniques with neat sketch and example.

3. Explain various types of un-supervised learning techniques with neat sketch and example.

4. Differentiate between different machine learning techniques.

5. Applications of ML

6. Explain various machine learning activities with relevant examples

7. Illustrate various ways of exploring numerical and categorical data.

8. Discuss the ways to handle outliers and missing values in improving data quality.

UNIT-2

1. Discuss about predictive and descriptive models.

2. Explain various methods used for training a supervised learning model (holdout, k-fold cross validation, bootstrap sampling, lazy vs early)

3. Illustrate under-fitting and overfitting with examples.

4. Explain various measures for evaluating the performance of a classification model. (model accuracy, error rate, kappa, sensitivity, specificity, precision, recall, f-measure, ROC)

5. Discuss how a regression model is evaluated (SST, SSE, R-squared)

6. Discuss Principal Component Analysis in feature extraction.

7. Discuss Singular Value Decomposition in feature extraction.

8. Discuss Linear Discriminant Analysis in feature extraction.

9. Discuss the four feature selection approaches with suitable diagrams

UNIT-3

1. Explain about Simple Linear Regression Model with suitable example.

2. Problems on Simple Linear Regression:

a) Finding regression equation

b) Calculating R-squared score

3. Discuss about OLS method in linear regression with an example.

4. Write a short note on multi-linear regression.

5. Illustrate polynomial regression with relevant example.

6. Illustrate logistic regression with relevant example.

7. Discuss the need of regularization in regression and explain different regularization techniques.

## UNIT-4

1. Discuss in detail the learning steps of classification.

2. Explain k-nearest neighbor classification algorithm with an example.

3. With a neat sketch, discuss the working of a random forest model.

4. Examine the principle operation of SVM classifier with an example

5. Discuss the role of kernel trick in support vector machines.

## UNIT-5

1. Illustrate various ensemble methods (bagging, boosting,stacking)

2. Explain the steps in AdaBoost algorithm with an example

3. Demonstrate Gradient Boosting Machines with an example

4. Discuss the features of XGBoost Algorithm

5. Explain various approaches to implement Reinforcement Learning

6. Discuss in detail Q-Learning algorithm with an example