

ST. JOSEPH'S COLLEGE (AUTONOMOUS)

BENGALURU-27



Re-accredited with 'A++' GRADE with 3.79/4 CGPA by
NAAC Recognized by UGC as College of Excellence

**ST. JOSEPH'S INSTITUTE OF INFORMATION
TECHNOLOGY**

DEPARTMENT OF ADVANCED COMPUTING

**SYLLABUS FOR CERTIFICATE COURSE – MACHINE
LEARNING USING R**

MACHINE LEARNING USING R

It is common for today's scientific and business industries to collect large amounts of data, and the ability to analyze the data and learn from it is critical to making informed decisions. Familiarity with software such as R allows users to visualize data, run statistical tests, and apply machine learning algorithms.

ELIGIBILITY:

A candidate who has passed the two years Pre-University Examination conducted by the Pre-University Education Board in Karnataka or Three years Diploma in Engineering of Government of Karnataka or any other examination considered equivalent thereto shall be eligible for admission

COURSE OBJECTIVES:

This course will provide the students to understand the concepts of Machine Learning, supervised learning and their applications, the concepts and algorithms of unsupervised learning, the concepts and algorithms of advanced learning.

TOTAL CREDITS: Two credits

COURSE OUTCOMES:

CO1: Design a learning model appropriate to the application.

CO2: Design a Neural Network for an application of your choice.

CO3: Use a tool to implement typical Clustering algorithms for different types of applications

CO4: Identify applications suitable for different types of Machine Learning with suitable justification.

UNIT 1: MACHINE LEARNING INTRODUCTION

(10 Hrs)

Machine Learning–Types of Machine Learning –Machine Learning process- preliminaries, testing Machine Learning algorithms, turning data into Probabilities, and Statistics for Machine Learning Probability theory – Probability Distributions – Decision Theory.

UNIT 2: SUPERVISED LEARNING

(15 Hrs)

Linear Models for Regression – Linear Models for Classification- Discriminant Functions, Probabilistic Generative Models, Probabilistic Discriminative Models – Decision Tree Learning – Bayesian Learning, Naïve Bayes – Ensemble Methods, Bagging, Boosting, Neural Networks, Multi-layer Perceptron, Feed-forward Network, Error Back propagation - Support Vector Machines.

UNIT 3: UNSUPERVISED LEARNING

(15 Hrs)

Clustering- K-means – EM Algorithm- Mixtures of Gaussians –Estimating means of K Gaussians-
General Statement of EM algorithm.

UNIT 4: DIMENSIONALITY REDUCTION

(15 Hrs)

Dimensionality Reduction, Linear Discriminant Analysis, Factor Analysis, Principal Components Analysis, Independent Components Analysis.

SELF STUDY

(5 Hrs)

SUGGESTED BOOKS:

1. Tom Mitchell, “Machine Learning”, McGraw-Hill, 1997.
2. Christopher Bishop, “Pattern Recognition and Machine Learning” Springer, 2007.
3. Stephen Marsland, “Machine Learning – An Algorithmic Perspective”, Chapman andHall, CRC Press, Second Edition, 2014.
4. Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012.
5. Ethem Alpaydin, “Introduction to Machine Learning”, MIT Press, Third Edition, 2014.