**Course Name: Programming with R Course Code:**

**Number of credits: 3 Number of Hours: 35**

**Course Outcomes**:

CO1: Familiarity with R basics and programming.

CO2: Knowledge of different data structures in R.

CO3: Exposure to various statistical techniques in R.

CO4: Exploration of data and its visualization using various libraries.

CO5: Modelling, Analyzing and interpretation of regression and classification algorithm in R.

**Module 1: Overview & Essentials of R Programming** **5 hrs**

Overview of R programming, Working with R-Studio, basic, Using R in-built functions (for string, numbers, date, etc.), Import and Export of data

***Learning Outcome:*** *Understand R environment and basic inbuilt functions of R*

**Module 2: Data Management 5 hrs**

Data Structure like vector, list, matrices, data frame, factor; Data Exploration and Data Manipulation

***Learning Outcome:*** *Apply the utility of different data structures of R*

**Module 3: Data Visualization 5 hrs**

Pie Charts, Line Charts, Histogram, Bar Chart, Kernel Density Plot, Quantile Quantile (Q-Q) Plot, Box plot, Violin Plot, Dot Chart, Bubble Plot, Image plot, Mosaic Plot, Scatter Plot Matrices, Scatter Plot Chart, Corrgrams, Tree Map, Heat Map Chart, Using GGPlot2 for Advanced Charts

***Learning Outcome:*** *Create different types of basic and advanced charts available in R*

**Module 4: Statistics using R 7.5 hrs**

Descriptive Statistics, Correlation and Covariance, Z-Test, T-Test, Chi-squared test, ANOVA

Non Parametric Techniques, Time series Analysis

***Learning Outcome:*** *Apply different statistical techniques on different datasets*

**Module 5: Regression & Classification 7.5 hrs**

Univariate and Multivariate regression, Logistic regression, RMSE, Confusion matrix, accuracy

***Learning Outcome:*** *Apply regression and classification algorithms on different dataset*

**Basic Texts:**

1. Motwani Bharti. Data analytics with R, Wiley India 2019
2. Gardener M. Beginning R, Wrox
3. Gergely Daroczi, Mastering Data Analysis with R, PACKT
4. Crawley, M. The R Book, 2/e. India: Wiley India 2013.

**Reference Books:**

1. Hadley Wickham, Garrett Grolemund. R for Data Science,O’Reilly
2. Garrett Grolemund. Hands-On Programming with R, O’Reilly

**Other references:**

1. S. R. Mani Sekhar, T. V. Suresh Kumar, Madhavi Kasa. Programming with R – Cengage publication