

Course Name : R Programming

Course Type : DSE

Course Credits : 3+1 credits

Objectives :

The objective of this course is to make students exercise the fundamentals of statistical analysis in R environment. They would be able to analysis data for the purpose of exploration using Descriptive and Inferential Statistics. Students will understand Probability and Sampling Distributions and learn the creative application of Linear Regression in multivariate context for predictive purpose.

Learning Outcomes:

After the successful completion of this module, students will be able to:

1. Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames.
2. Describe key terminologies, concepts and techniques employed in Statistical Analysis.
3. Define, Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.
4. Conduct and Interpret a variety of Hypothesis Tests to aid Decision Making.
5. Understand, Analyse, Interpret Correlation and Regression to analyse the underlying relationships between different variables.

Unit 1:

Introduction to R Programming, R-Installation, R-IDE, Advantages and Disadvantages. R-Packages, Basic syntax, Data Types, Variables, Operators and Keywords, Decision making, Looping and Functions

Unit 2:

String: String manipulation, R-data structures, Vectors, Lists, Arrays, Matrix, Data frame, Factors

Unit 3:

Data Reshaping, Object Oriented Programming, R-Debugging, Data Interfaces: csv files, excel files, Binary, XML and JSON File

Data Visualization: Pie chart, Bar Chart, Boxplot, Histogram, Line graphs and Scatter plot

Unit 4:

Statistics with R: Mean, Median and Mode, R-Regression, Linear Regression, Logistic Regression, Normal distribution, Binomial distribution, Classification, Time Series Analysis, Basic Data Analysis with R

Recommended Books

- 1) Paul Teetor, "R cookbook", O'RIELLY Publications
- 2) Norman Matloff, "The art of R Programming", No Starch Press
- 3) Sandip Rakshit ,R Programming for Beginners, Tata Mc Graw Hill

Course Name: Lab Course on R programming

List of Practicals for R Programming

- Write a R program to take input from the user (name and age) and display the values. Also print the version of R installation.
- Write a R program to get the details of the objects in memory.
- Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
- Write a R program to create a vector which contains 10 random integer values between -50 and +50.
- Write a R program to get the first 10 Fibonacci numbers.
- Write a R program to get all prime numbers up to a given number (based on the sieve of Eratosthenes).
- Write a R program to print the numbers from 1 to 100 and print "Fizz" for multiples of 3, print "Buzz" for multiples of 5, and print "Fizz Buzz" for multiples of both.
- Write a R program to extract first 10 English letters in lower case and last 10 letters in upper case and extract letters between 22nd to 24th letters in upper case.
- Write a R program to find the factors of a given number.
- Write a R program to find the maximum and the minimum value of a given vector.
- Write a R program to get the unique elements of a given string and unique numbers of vector.
- Write a R program to create three vectors a,b,c with 3 integers. Combine the three vectors to become a 3×3 matrix where each column represents a vector. Print the content of the matrix.
- Write a R program to create a list containing strings, numbers, vectors and a logical value.
- Write a R program to list containing a vector, a matrix and a list and give names to the elements in the list.
- Write a R program to create a list containing a vector, a matrix and a list and give names to the elements in the list. Access the first and second element of the list.
- Write a R program to create a list containing a vector, a matrix and a list and add element at the end of the list
- R programming Array Examples
- R programming Data frame Examples
- R programming Matrix Examples
- R programming Vector Examples
- R programming List Examples
- R programming Factors Examples