Course Title:	Programming with R
Course Code:	STAT-203
Semester:	IV
Credit Hours:	3 Credit Hours
Pre-requisites:	N / A

Learning Outcomes

By the end of this course, students will be able to:

1. Get familiar with the interface of R along with the objects required for the purpose of data analysis.
2. Learn the basic programming skills including logical statements, looping and graphical functions.
3. Generate random numbers and simulate data from different distributions.
4. Estimate Regression and Time Series models based on Monte Carlo Simulations and Bootstrapping.

Course Outline

Unit 1

1.1 Introduction to R and its Framework

Downloading, Installing and Starting R and associate libraries. Calculating environment of R, Types of R objects, Vector, Matrix, Data frame, Array etc. Writing Scripts, Basic programming skills, Logical statements, Looping, Programming flow and basic debugging. Using built-in functions, Input and Output files, Programming with functions, Graphics.

Unit 2

2.1 Empirical Study of Sampling Distributions

Probability and probability distributions, Generating random numbers, Selecting random samples, Empirical study of the sampling distribution of estimators.

2.2 Data Simulation

Simulation of data from a probability distribution, Simulation of data for a regression model, Simulation of data for time series model, Monte Carlo simulation, Bootstrapping.

- **Teaching-learning Strategies:**

Class Lecture method, which includes seminars, discussions, assignments and projects. (Audio-visual tools are used where necessary)

- **Assignments-Types and Number with calendar:**

According to the choice of respective teacher.

- **Assessment and Examinations:**

According to the University's Semester Rules.

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	It takes place at the mid-point of the semester.
2	Formative Assessment	25%	It is continuous assessment. It includes: Classroom participation, attendance, assignments, and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.
3	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

Text Book

1. Purohit, S. G., Gore, S. G., & Deshmukh, S. R. (2008). *Statistics Using R.* Narosa Publishing House

Suggested Readings:

1. Fischetti, A. (2018). *Data Analysis with R: A comprehensive guide to manipulating, analyzing and visualizing data in R*. Packt Publishing Ltd.
2. Jones, O., Maillardet, R., & Robinson, A. (2014). *Introduction to scientific programming and simulation using R*. Chapman and Hall/CRC.