

## R Programming for Data Science Curriculum

Welcome to the R Programming for Data Science curriculum. This program is designed to take you from a beginner to a proficient level in R programming, with a focus on data science applications. Through a series of modules, you will learn the fundamentals of R, how to work with data, perform analysis, create visualizations, and present your findings. Each module includes detailed study materials, interactive quizzes, and hands-on projects to reinforce learning. Upon completion, learners will have a robust portfolio demonstrating their proficiency in using R for real-world data science tasks.

**Duration:** 1 month, minimum of 2 hours per week

### Module 1: Fundamentals of R Programming

**Objective:** Introduce the basics of R programming, including data types, structures, and base functions.

**Key Topics:**

- Introduction to R programming language
- Data types and structures in R
- Basic R functions and data simulations
- Introduction to functional programming and user-defined functions in R

**Assessment:** Multiple-choice quiz and practical exercises on data types and structures.

### Module 2: R Packages and R Project

- **Objective:** Learn to enhance R's functionality with packages and manage data science projects effectively using RStudio.

- **Key Topics:**

- Understanding base functions and packages in R
- Installing and loading R packages
- Setting up a working directory and using RStudio projects for workflow organization.
- Import and manage data from different formats.

**Assessment:** Project setup and data import exercise; quiz on R packages.

### **Module 3: Data Analysis and Visualization**

**Objective:** Master data manipulation and visualization techniques for insightful data analysis.

**Key Topics:**

- Utilizing the pipe operator and magrittr package for functional chaining
- Data manipulation with the dplyr package
- Introduction to data visualization with ggplot2 and plotly for dynamic plots

**Assessment:** Data manipulation and visualization project; quiz on dplyr and ggplot2.

### **Module 4: Rmarkdown and Quarto for Presentation**

**Objective:** Learn to create professional reports and presentations with Rmarkdown and Quarto.

**Key Topics:**

- Basics of rmarkdown and quarto for reporting
- Markdown syntax essentials
- Generating reports in HTML, PDF, and MS-Word formats
- Creating presentations with xaringan

**Assessment:** Create a report and a presentation using Rmarkdown and Quarto.

### **Capstone Project**

**Objective:** Apply the skills learned in a comprehensive project that showcases your ability to use R for data science.

**Project Brief:** Conduct a data analysis project from data import to final presentation, including data cleaning, analysis, visualization, and reporting.

**Deliverables:** A complete R project repository, including data, scripts, and a final report/presentation.