

R Programming

Duration: 24 hours (3 days)

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Course Outcomes

- Understand R and R Studio's significance in data science, including installation and basic navigation.
- Familiarize yourself with R Studio's interface, tools, and package management for efficient data analysis.
- Develop proficiency in organizing projects, managing workspaces, and understanding R project architecture.
- Gain foundational knowledge of R language syntax, data types, operators, and data structures (vectors, data frames, lists).
- Learn data import/export techniques, utilize descriptive statistics, and create effective data visualizations using ggplot2.
- Master function creation, control structures, and explore community resources while keeping R and its packages updated.

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Module 1: Introduction to R and R Studio

- Introduction
- History and evolution of language
- Place of R Studio
- R's positioning in data science
- Discovery of R & R Studio
- Download and install

Module 2: Navigating the R Studio Interface

- The 4 windows of the R Studio interface
- The different tools of R Studio

Module 3: Managing Packages and Settings

- Installing Packages
- Setting Options
- The help

Module 4: Organizing Your Work in R

- Organize your work in R
- Project R
- Notion of working directory, workspace

- Architecture of the R project
 - Scripts
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Module 5: Fundamentals of the R Language

- The basics of the R language
 - Data types: numeric, factors, strings, booleans, dates, etc.
 - The summons
 - Operators
 - Mathematical functions
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Module 6: Data Structures in R

- The different data structures
 - Vectors: initialization and manipulation
 - Data.frames: initialization and manipulation
 - Lists: initialization and manipulation
 - Some useful functions
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Module 7: Data Import and Export

- Data Import and Export
 - The different file formats: csv, txt
 - Using the Import Tool
 - Some verification functions
 - Export
 - Importing scripts
 - Workspace export
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Module 8: Data Description and Exploration

- Data description
 - Descriptive Functions for Numeric Variables
 - Descriptive Functions for Categorical Variables
 - Contingency table creation
 - Creating an Aspect Ratio Table
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Module 9: Data Visualization

- Data visualization
 - Basic graphical functions
 - The ggplot2 package
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Module 10: Function Creation and Control Structures

- Functions
- Declaring a Function
- Arguments of a function
- Calling a function

- Loops: For Loop, While Loop
 - If and ifelse control structures
 - Apply functions
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Module 11: R Updates and R Essential Packages

- How to find help
 - Online help
 - The apropos function
 - The bookdown site
 - The R Community
 - Developer Forums
 - Package updates, RStudio Update, Updating R
 - Introducing some must-have packages
 - DPLYR for data manipulation
 - ggplot2 for graphing
 - rmarkdown for automated dynamic reporting
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