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

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

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

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

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

Module 9: Data Visualization
- Data visualization
- Basic graphical functions
- The ggplot2 package

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

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