deerwalk training center

DTB-STU-102

Introduction to Statistical Analysis Using R

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Program Information

Statistical Analysis using R: Level 1

Nature of the Course
Theory + Practical

Total Hours per Day
2 hours

Course Duration
5 Weeks

Objectives

The R course at the Deerwalk Training Center offers a comprehensive set of software tools for data processing, calculation, and graphical display. It consists of the following components: an efficient data handling and storage facility, a set of operators for working with arrays, particularly matrices. This course covers a well-developed, simple, and effective programming language with conditionals, loops, user-defined recursive functions, and input and output facilities.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

- Has attended 90% of all classes held
- Has received an average grade of 80% on all assignments
- Has received an average of 60% in assessments
- The tutor believes the student has grasped all of the concepts and is ready to go on to the second module.

Required Textbooks

- Andrie de Vries and Joris Meys, “R for Dummies”, Wiley.
- Jum Albert and Maria Rizzo, “R by Example”, Springer Media
- Michael J. Crawley, “The R Book”, Wiley.

Prerequisites

- There are no specific prerequisites for learning R.
- If you want to utilize R for a variety of analytical tasks, you'll need to 1 have a basic understanding of statistics.
- However, to get started with R as a programming language, you don't need to know any of the other programming languages.

Course Details

Week 1

Lesson 1

R Analytics

- Introduction and preliminaries
- The R environment
- Related software and documentation
- R and statistics
- Using R interactively
- An introductory session
- Getting help with functions and features
- R commands, case sensitivity, etc.
- Executing commands from or diverting output to a file
- Data permanency and removing objects

Lesson 2

Simple Manipulations; Numbers And Vector

- Vectors and assignment
- Vector arithmetic
- Generating regular sequences
- Logical vectors
- Missing values
- Character vectors
- Index vectors; selecting and modifying subsets of a data set
- Other types of objects

Week 2

Lesson 1

Ordered And Unordered Factors

- A specific example
- The function apply() and ragged arrays
- Ordered factors

Lesson 2

Arrays And Matrices

- Arrays
- Array indexing. Subsections of an array
- Index matrices
- The array() function
- Mixed vector and array arithmetic. The recycling rule
- The outer product of two arrays

Lesson 3

Generalized Transpose Of An Array

- Matrix
- Linear equations and inversion
- Forming partitioned matrices, cbind() and rbind5.9 The concatenation
- function, c(), with arrays
- Frequency tables from factors

Lesson 4

Lists And Data Frames

- Lists
- Constructing and modifying lists
- Concatenating lists

Week 3 :

Lesson 1

Data Frames

- Making data frames
- attach() and detach()
- Working with data frames
- Attaching arbitrary lists
- Managing the search path

Lesson 2

Reading Data From Files

- The read.table() function
- The scan() function
- Accessing built-in datasets
- Loading data from other R packages

Week 4 :

Lesson 1

Grouping, Loops And Conditional Execution

- Grouped expressions
- Control statements
- Conditional execution: if statements
- Repetitive execution: for loops, repeat and while

Lesson 2

Writing Your Own Functions

- Assignments within functions
- Scope
- Classes, generic functions and object orientation
- Defining new binary operators
- Named arguments and defaults
- Simple examples

Week 5 :

Lesson 1

High-Level Plotting Commands

- The plot() function
- Displaying multivariate data
- Display graphics
- Arguments to high-level plotting functions
- Low-level plotting commands
- Mathematical annotation
- Hershey vector fonts
- Interacting with graphics
- Using graphics parameters
- Permanent changes: The par() function
- Temporary changes: Arguments To Graphics Functions

Lesson 2

Packages

- Standard packages
- Contributed packages and CRAN
- Namespaces

Labs

Lab assignments will focus on the practice and mastery of contents covered in the lectures and introduce critical and fundamental problem-solving techniques to the students.

Program Information

Intermediate Statistical Analysis using R: Level 2

Nature of the Course
Theory + Practical

Total Hours per Day
2 hours

Course Duration
3 Weeks

Objectives

The R course at the Deerwalk Training Center offers a comprehensive set of software tools for data processing, calculation, and graphical display. It consists of the following components: an efficient data handling and storage facility, a set of operators for working with arrays, particularly matrices. This course covers a well-developed, simple, and effective programming language with conditionals, loops, user-defined recursive functions, and input and output facilities

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Course Details

Week 1

Lesson 1

Data Transformation Using Dplyr

- Summarize Cases
- Group Cases
- Manipulate Cases
- Extract Cases
- Arrange Cases
- Manipulate Variables
- Extract Variables
- Make New Variables
- Vectorized Functions
- Summary Functions
- Combine Variables
- Combine Cases

Lesson 2

R Mark down

- Knitr
- .Rmd files
- Interactive Documents
- Parameters
- Pandoc's Markdown
- YAML
- Re-using Template
- Table Suggestions

Week 2

Lesson 1

Building Application

- Part 1 - How to build a Shiny app
- Introduction
- R
- App architecture
- App template
- Inputs and outputs
- The server functions
- Sharing apps
- Shinyapps.io 7
- Shiny servers

Lesson 2

Part 2 - How To Customize Reactions

- Introduction
- Review of Part 1
- Reactivity
- Reactive values
- Reactive functions
- render*()
- reactive ()
- isolate ()
- observe Event ()
- event Reactive ()
- reactive Values ()
- Parting tips

Week 3 :

Lesson 1

Part 3 - How To Customize Appearance

- Introduction
- Review of Parts 1 and 2
- HTML UI
- Adding static content
- Building layouts
- Panels and Tabsets
- Prepackaged layouts
- CSS

Lesson 2

R As A Database Management System (Dbms)

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- Writing Functions
- Cursor and Views
- Big Data in R
- Automation using R

Labs

Lab assignments will focus on the practice and mastery of contents covered in the lectures and introduce critical and fundamental problem-solving techniques to the students

Learning Outcomes

- Import, examine, manipulate, and summarize data sets in R
- Explore data sets to develop testable hypotheses and find applicable statistical tests
- Use R to do relevant statistical tests Create and edit visualizations with R
- Learn the fundamentals of R programming, including constructions, control statements, and string functions
- Identify the key terminologies, concepts, and techniques used in statistical analysis.
- Learn how to use R programming for text processing
- Able to understand and implement R programming from a statistical standpoint.

deerwalk
training center

Sifal, Kathmandu, Nepal
Phone: +977 - 01 - 5913021 | 4567153
Mobile: +977 - 9765355167 | 9860422021
Email: training@deerwalkcompware.com
Website: deerwalktrainingcenter.com