**CORPORATE TRAINING COURSES**

**Title:** Introduction to R

**Duration:** 2 Days

**Pre-requisite:** No special pre-requisite other than knowing how to use a computer

**Description**

This course will introduce you to the R programming language, the most widely used language for statistical computing and graphics. It is relatively easy to use, and the basics can be learned fairly quickly, yet it is powerful and versatile. Countless data scientists choose it as their primary tool for data insights and analysis, and it is a common choice in academia for academic and doctoral researchers. This course will begin with helping you install R and becoming familiar with the RStudio development environment. We will initially learn the basics of the language such as variables, data structures, loops, statements and functions. As we proceed through the foundations of the language, we will eventually work through doing actual data analysis and visualization. The goal of this course is to help you master the basics of R and to understand its power and use. We will accomplish this through the use of hands-on projects and use cases.

**Learning Objectives**

* Install R and RStudio on personal computer.
* Learn the basics of the R programming language by completing hands-on exercises and milestones.
* Understand statistical computing and the power of R.
* Learn how to manipulate and analyze data using R.
* Learn why R is one of the most widely used languages for data science.
* Learn R’s powerful data visualization capabilities.
* Create 2 different projects using R.
* Understand how R is used in industry and academics.

**Course Outline**

* Course Introduction
* Overview of the Language
* Installing R and RStudio
* Basic Operations
* Variables in R
* Working with Strings
  + Manipulating Strings
  + Concatenating Strings
  + Finding Patterns in Strings
  + Replacing Patterns in Strings
  + Regular Expressions
* Programming Structures
  + For Loop
  + While Loop
  + Conditional Statements
  + Nested Statements
  + User-defined Functions
* Data Structures
* Vectors
* Creating Vectors
* Indexing Vectors
* Filtering Vectors
* Sorting Vectors
* Vector Functions
* Vectorized Operations
* Vectors
* Matrices
  + Creating Matrices
  + Indexing Matrices
  + Applying Functions to Matrices
  + Creating Multidimensional Arrays
  + Indexing Multidimensional Arrays
* Milestone 1: Data Handling and Manipulation
* Lists
* Creating Lists
* Indexing Lists
* Editing Values in Lists
* Factors
  + Working with Factors
  + Creating Ordered and Unordered Factors
  + Using Factor Levels to Split a Vector
* Data Frame
* Creating and Understanding Data Frames
* Loading External Data into a Data Frame
* Indexing, Filtering, and Editing Values within a Data Frame
* Applying Functions to a Data Frame
* Merging Data Frames
* Exporting Data from Within a Data Frame to an External File
* Milestone Project 2 – Data Analysis, Analyze the Output from a Linear Regression Analysis
* Data Visualization in Base R
* Plotting Line Charts
* Customizing Charts
* Building Scatterplots
* Plotting Histograms
* Plotting Density Lines
* Plotting Bar Charts
* Plotting Pie Charts
* Plotting Boxplots
* Exporting Charts
* Milestone Project 3 – Build and Export a Custom Chart for Data Visualization
* Conclusion: Moving Forward with R

**Structured Activity/Exercises/Case Studies**

Milestone Project 1: Data Handling and Manipulation

Milestone Project 2: Data Analysis, Analyze the Output from a Linear Regression Analysis

Milestone Project 3: Build and Export a Custom Chart for Data Visualization

**Training material provided:** Yes (Digital format)