

## **About Codefrux**

While the current trends around the world are based on the internet, mobile and its applications, we try to make the most out of it. As for us, we are a well established IT professionals based in Bangalore, constantly coping up with the extensive advancement and adapting to new Technology. Since the start of the company in 2010, our niches are Mobile Application Development, Web Application Development, Staffing Services and Training Programs (includes Corporate Training).

## **What you will Learn In This Course**

- Gain a foundational understanding of business analytics
- Install R, R-studio, and workspace setup. You will also learn about the various R packages
- Master the R programming and understand how various statements are executed in R
- Gain an in-depth understanding of data structure used in R and learn to import/export data in R
- Define, understand and use the various apply functions and DPLYR functions
- Understand and use the various graphics in R for data visualization
- And many more

## **Who can learn Data Science**

- IT professionals looking for a career switch into data science and analytics
- Software developers looking for a career switch into data science and analytics
- Professionals working in data and business analytics
- Graduates looking to build a career in analytics and data science

## 1. INTRODUCTION TO DATA SCIENCE

### Topics

- a. What is data Science?.
- b. Importance of Data Science.
- c. Demand for Data Science Professional.
- d. Brief Introduction to Big data and Data Analytics.
- e. Lifecycle of data science.
- f. Tools and Technologies used in data Science.
- g. Business Intelligence vs Data Science.
- h. Role of a data scientist.
- i. Quiz
- j. Summary
- k. Hands on

## 2. Introduction to R

### Topics

- a. R Basics – Introduction and discussion.
- b. Comprehensive R Archive Network
- c. Demo of Installing R On windows from CRAN Website
- d. Installing R Studios on Windows OS
- e. Setting Up R Workspace.
- f. Getting Help for R-How to use help system
- g. Installing Packages – Loading And Unloading Packages
- h. Quiz
- i. Summary
- j. Hands on

## 3. Programming with R

### Topics

- a. Operators in R – Arithmetic, Relational, Logical and Assignment Operators
- b. Variables,Types Of Variables,Using variables
- c. Conditional statements,ifelse(),switch
- d. Loops: For Loops,While Loops,Using Break statement,Switch
- e. Quiz
- f. Summary
- g. Hands on

## 4. The R Programming Language- Data Types And Functions

### Topics

- a. Use R for simple maths, creating data objects from the keyword.
- b. How to make different type of data objects.
- c. Understand the various data types that the language supports.
- d. Introduction to Functions in R
- e. Types of data structures in R
- f. Arrays And Lists- Create Access the elements

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- g. Vectors – Create Vectors, Vectorized Operations, Power of Vectorized Operations
  - h. Matrices- Building the first matrices, Matrix Operations, Subsetting, visualising subset, Visualising with `matplot()`
  - i. Factors – Creating a Factor
  - j. Data Frames- create and filter data frames, Building And Merging data frames
  - k. Quiz
  - l. Summary
  - m. Hands on

## 5. Functions And Importing data into R

### Topics

- a. Function Overview – Naming Guidelines
- b. Arguments Matching, Function with Multiple Arguments
- c. Additional Arguments using Ellipsis, Lazy Evaluation
- d. Multiple Return Values
- e. Function as Objects, Anonymous Functions
- f. Importing and exporting Data into R- importing from files like excel, csv and minitab.
- g. Import from URL and excel Files
- h. Import from database.
- i. Quiz
- j. Summary
- k. Hands on

## 6. Data Descriptive Statistics, Tabulation, Distribution

### Topics

- a. Summary Statistics for Matrix Objects. The `apply()` Command. Converting an Object into a Table
- b. Histograms, Stem and Leaf Plot, Density Function. Normal Distribution and Other Distributions.
- c. Hypothesis Testing: T-test, U-test, Correlation and Co-variance, Chi-Squared Tests etc
- d. Introduction to Graphical Analysis
- e. Graphics in R – Types of graphics
- f. Bar Chart, Pie Chart, Histograms- How to create and edit.
- g. Box Plots- Basics of Boxplots- Create and Edit
- h. Visualisation in R using `ggplot2`.
- i. More About Graphs: Adding Legends to Graphs, Adding Text to Graphs, Orienting the Axis Label.
- j. Quiz
- k. Summary
- l. Hands on

## 7. Complex Statistics And Manipulating Data

### Topics

- a. Analysis of Variance (ANOVA),

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- b. Extracting Means and Summary Statistics
  - c. Creating and Setting Factor Data, `rowsum()`, `apply()`, Using `tapply()`, `lapply()`
  - d. Quiz
  - e. Summary
  - f. Hands on

## 8. Descriptive Statistics

### Topics

- a. Describe or summarize a set of data.
- b. Measures of central tendency and measures of dispersion
- c. The mean, median, and mode
- d. Computing standard deviation of grouped data
- e. Quiz
- f. Summary
- g. Hands on

## 9. Inferential Statistics

### Topics

- a. Creating a confidence interval
- b. Inference for categorical data.
- c. T-test, Analysis of Variance (ANOVA)
- d. Analysis of Covariance (ANCOVA)
- e. Regression analysis
- f. Quiz
- g. Summary
- h. Hands on

## 10. Hypothesis Testing

### Topics

- a. Basics of Hypothesis Testing
- b. Type of test and Rejection Region
- c. Type o errors-Type 1 Errors,Type 2 Errors
- d. P value method,Z score Method
- e. Quiz
- f. Summary
- g. Hands on

## 11. Revision of Linear Algebra Concepts

### Topics

- a. Basic Understanding of Linear Algebra,
- b. Matrices,vectors
- c. Addition and Multiplication of Matrices
- d. Inverse And Transpose of Matrix
- e. Quiz
- f. Summary
- g. Hands on

## 12. Introduction To Machine Learning

### Topics

- a. What is Machine Learning?
- b. What is the Challenge?
- c. Introduction to Supervised Learning, Unsupervised Learning
- d. What is Reinforcement Learning?
- e. Quiz
- f. Summary
- g. Hands on

## 13. Linear Regression

### Topics

- a. Introduction to Linear Regression
- b. Linear Regression with Multiple Variables
- c. Disadvantage of Linear Models
- d. Case Study – Application of Linear Regression for Housing Price Prediction
- e. Quiz
- f. Summary
- g. Hands on

## 14. Logistic Regression

### Topics

- a. Introduction to Logistic Regression.– Why Logistic Regression .
- b. Introduce the notion of classification
- c. Cost function for logistic regression
- d. Application of logistic regression to multi-class classification.
- e. Confusion Matrix And ROC Curve
- f. Advantages And Disadvantages of Logistic Regression.
- g. Case Study: To classify an email as spam or not spam using logistic Regression.
- h. Quiz
- i. Summary
- j. Hands on

## 15. Decision Trees And Supervised Learning

### Topics

- a. Decision Tree – data set
- b. How to build decision tree?
- c. Classification Rules- Overfitting Problem
- d. Stopping Criteria And Pruning
- e. How to Find final size of Trees?
- f. Multiway Split.
- g. Model A decision Tree.
- h. KNN- K Nearest Neighbours- Application And Advantages
- i. Naive Bayes

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- j. Random Forests and Support Vector Machines
  - k. Quiz
  - l. Summary
  - m. Hands on

## 16. Unsupervised Learning

### Topics

- a. k-Means algorithm for clustering – groupings of unlabeled data points.
- b. Hierarchical Clustering
- c. Principal Component Analysis(PCA)- Data Compression to Speed up Learning Algorithms
- d. Independent components analysis(ICA)
- e. Anomaly Detection
- f. Recommender System-collaborative filtering algorithm
- g. Case Study– Recommendation Engine for e-commerce/retail chain
- h. Quiz
- i. Summary
- j. Hands on

## 17. Natural language Processing

### Topics

- a. Introduction to natural Language Processing(NLP).
- b. Word Frequency Algorithms for NLP
- c. Sentiment Analysis
- d. Case Study – Data Mine with Twitter.
- e. Quiz
- f. Summary
- g. Hands on

## **Project Work**

After course completion, students will be assigned to work on live project to polish the technology skills you have acquired with us.