



TECHNOCATION FREELANCING TRAINING INSTITUTE & SOFTWARE HOUSE

Professional R Programming Course Outline

Module 1: Introduction to R Programming

- Overview of R & Its Applications in Data Science
- Installing R & RStudio (IDE)
- Understanding the R Environment & Basic Syntax
- Working with R Packages & Libraries

Module 2: R Data Structures & Types

- Vectors, Matrices, Lists, and Data Frames
- Factors & Their Role in Data Analysis
- Working with Dates & Time in R
- Handling Missing Values & Data Cleaning

Module 3: Data Importing & Exporting

- Reading Data from CSV, Excel, JSON, and Databases
- Web Scraping & API Integration in R
- Writing & Exporting Data in Various Formats
- Connecting R with SQL Databases

Module 4: Data Manipulation with dplyr & tidyr

- Filtering, Sorting, and Summarizing Data
- Merging & Joining Datasets
- Reshaping Data: Wide vs. Long Format
- Handling Duplicates & Missing Data

Module 5: Data Visualization with ggplot2

- Creating Bar Charts, Line Graphs, and Scatter Plots

- Customizing Graphs (Colors, Labels, Themes)
- Advanced Visualization (Faceting, Density Plots, Heatmaps)
- Interactive Dashboards with Shiny

Module 6: Statistical Analysis in R

- Descriptive Statistics (Mean, Median, Standard Deviation)
- Hypothesis Testing (t-tests, Chi-square, ANOVA)
- Correlation & Regression Analysis
- Time Series Analysis & Forecasting

Module 7: Machine Learning with R

- Introduction to Machine Learning in R
- Supervised Learning: Regression & Classification (Linear Regression, Logistic Regression, Decision Trees, Random Forest)
- Unsupervised Learning: Clustering & Dimensionality Reduction (K-Means, PCA)
- Model Evaluation & Performance Metrics

Module 8: Text Mining & Natural Language Processing (NLP)

- Working with Text Data & Tokenization
- Sentiment Analysis & Word Cloud Visualization
- Topic Modeling with LDA
- Web Scraping & Text Analysis Applications

Module 9: Big Data & Parallel Computing in R

- Working with Large Datasets (data.table & SparkR)
- Parallel Processing & Performance Optimization
- Connecting R with Hadoop & Spark
- Cloud-Based Data Processing in R

Module 10: Automation & Reporting in R

- Automating Reports with RMarkdown
- Generating Dynamic Reports & Dashboards
- Scheduling Automated Tasks in R
- Deploying R Scripts in Production

Module 11: R for Business Analytics & Finance

- Financial Data Analysis & Stock Market Prediction
- Customer Segmentation & Market Basket Analysis
- Risk Management & Portfolio Optimization
- Fraud Detection with Machine Learning

Module 12: Final Project & Certification Preparation

- Developing an End-to-End Data Science Project
- Applying R in Real-World Case Studies
- Preparing for R Programming Certification (Tidyverse, DataCamp, Coursera)
- Career Paths & Job Opportunities in R Programming