uCertify

# Course Outline

## The Complete R Handbook

04 Aug 2025

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2. Exercises, Quizzes, Flashcards & Glossary

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3. Expert Instructor-Led Training
4. ADA Compliant & JAWS Compatible Platform
5. State of the Art Educator Tools
6. Award Winning Learning Platform (LMS)
7. Chapter & Lessons

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   Chapter 2: R: What It Does and How It Does It

   Chapter 3: Working with Packages, Importing, and Exporting

   Chapter 4: Getting Graphic

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   Chapter 6: Deviating from the Average

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Chapter 24: Into the Forest, Randomly

Chapter 25: Support Your Local Vector

Chapter 26: K-Means Clustering

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Chapter 28: Exploring Marketing

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Chapter 31: Dashboards — How Dashing!

Videos and How To

8. Live labs

Lab Tasks

Here's what you get

## 1. Course Objective

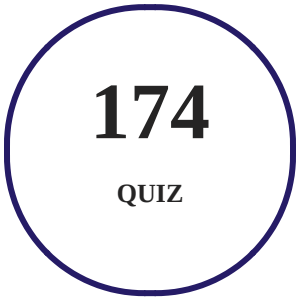
The Complete R Handbook course is designed to equip you with the skills and knowledge needed to leverage R for statistical analysis, data manipulation, visualization, and more. The course helps you dive into the basics of R programming, including data types, variables, functions, and control structures and Learn how to manipulate data in R using packages like dplyr and tidyr for efficient data wrangling. The course helps you explore statistical analysis techniques in R, including hypothesis testing, regression analysis, and ANOVA.

## 2. Exercises

There is no limit to the number of times learners can attempt these. Exercises come with detailed remediation, which ensures that learners are confident on the topic before proceeding.

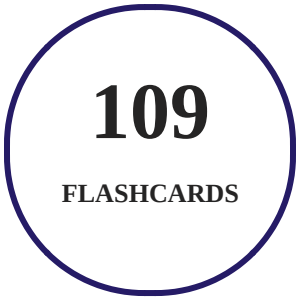
## 3. Quiz

Quizzes test your knowledge on the topics of the exam when you go through the course material. There is no limit to the number of times you can attempt it.



## 4. flashcards

Flashcards are effective memory-aiding tools that help you learn complex topics easily. The flashcard will help you in memorizing definitions, terminologies, key concepts, and more. There is no limit to the number of times learners can attempt these. Flashcards help master the key concepts.




## 5. Glossary of terms

uCertify provides detailed explanations of concepts relevant to the course through Glossary. It contains a list of frequently used terminologies along with its detailed explanation. Glossary defines the key terms.

## 6. Expert Instructor-Led Training

uCertify uses the content from the finest publishers and only the IT industry's finest instructors. They have a minimum of 15 years real-world experience and are subject matter experts in their fields. Unlike a live class, you can study at your own pace. This creates a personal learning experience and gives you all the benefit of hands-on training with the flexibility of doing it around your schedule 24/7.

## 7. ADA Compliant & JAWS Compatible Platform

uCertify course and labs are ADA (Americans with Disability Act) compliant. It is now more accessible to students with features such as:

- Change the font, size, and color of the content of the course
- Text-to-speech, reads the text into spoken words
- Interactive videos, how-tos videos come with transcripts and voice-over
- Interactive transcripts, each word is clickable. Students can clip a specific part of the video by clicking on a word or a portion of the text.

JAWS (Job Access with Speech) is a computer screen reader program for Microsoft Windows that reads the screen either with a text-to-speech output or by a Refreshable Braille display. Student can easily navigate uCertify course using JAWS shortcut keys.

## 8. State of the Art Educator Tools

uCertify knows the importance of instructors and provide tools to help them do their job effectively. Instructors are able to clone and customize course. Do ability grouping. Create sections. Design grade scale and grade formula. Create and schedule assessments. Educators can also move a student from self-paced to mentor-guided to instructor-led mode in three clicks.

## 9. Award Winning Learning Platform (LMS)

uCertify has developed an award winning, highly interactive yet simple to use platform. The SIIA CODiE Awards is the only peer-reviewed program to showcase business and education technology's finest products and services. Since 1986, thousands of products, services and solutions have been recognized for achieving excellence. uCertify has won CODiE awards consecutively for last 7 years:

- **2014**
    1. Best Postsecondary Learning Solution

- **2015**
    1. Best Education Solution
    2. Best Virtual Learning Solution
    3. Best Student Assessment Solution
    4. Best Postsecondary Learning Solution
    5. Best Career and Workforce Readiness Solution
    6. Best Instructional Solution in Other Curriculum Areas
    7. Best Corporate Learning/Workforce Development Solution

- **2016**
    1. Best Virtual Learning Solution
    2. Best Education Cloud-based Solution
    3. Best College and Career Readiness Solution
    4. Best Corporate / Workforce Learning Solution
    5. Best Postsecondary Learning Content Solution
    6. Best Postsecondary LMS or Learning Platform
    7. Best Learning Relationship Management Solution

- **2017**
    1. Best Overall Education Solution
    2. Best Student Assessment Solution
    3. Best Corporate/Workforce Learning Solution
    4. Best Higher Education LMS or Learning Platform

- **2018**
    1. Best Higher Education LMS or Learning Platform
    2. Best Instructional Solution in Other Curriculum Areas
    3. Best Learning Relationship Management Solution

- **2019**
    1. Best Virtual Learning Solution
    2. Best Content Authoring Development or Curation Solution
    3. Best Higher Education Learning Management Solution (LMS)

- **2020**
    1. Best College and Career Readiness Solution
    2. Best Cross-Curricular Solution
    3. Best Virtual Learning Solution

## 10. Chapter & Lessons

uCertify brings these textbooks to life. It is full of interactive activities that keeps the learner engaged. uCertify brings all available learning resources for a topic in one place so that the learner can efficiently learn without going to multiple places. Challenge questions are also embedded in the chapters so learners can attempt those while they are learning about that particular topic. This helps them grasp the concepts better because they can go over it again right away which improves learning.

Learners can do Flashcards, Exercises, Quizzes and Labs related to each chapter. At the end of every lesson, uCertify courses guide the learners on the path they should follow.

## Syllabus

### Chapter 1: Introduction

- About This All-in-One
- What You Can Safely Skip
- Icons Used in This Course
- Where to Go from Here

### Chapter 2: R: What It Does and How It Does It

- The Statistical (and Related) Ideas You Just Have to Know

- Getting R
- Getting RStudio
- A Session with R
- R Functions
- User-Defined Functions
- Comments
- R Structures
- for Loops and if Statements

## Chapter 3: Working with Packages, Importing, and Exporting

- Installing Packages
- Examining Data
- R Formulas
- More Packages
- Exploring the tidyverse
- Importing and Exporting

## Chapter 4: Getting Graphic

- Finding Patterns

- Doing the Basics: Base R Graphics, That Is
- Kicking It Up a Notch to ggplot2
- Putting a Bow On It

## Chapter 5: Finding Your Center

- Means: The Lure of Averages
- Calculating the Mean
- The Average in R: mean()
- Medians: Caught in the Middle
- The Median in R: median()
- Statistics à la Mode
- The Mode in R

## Chapter 6: Deviating from the Average

- Measuring Variation
- Back to the Roots: Standard Deviation
- Standard Deviation in R

## Chapter 7: Meeting Standards and Standings

- Catching Some Zs
- Standard Scores in R
- Where Do You Stand?
- Summarizing

## Chapter 8: Summarizing It All

- How Many?
- The High and the Low
- Living in the Moments
- Tuning in the Frequency
- Summarizing a Data Frame

## Chapter 9: What’s Normal?

- Hitting the Curve
- Working with Normal Distributions
- Meeting a Distinguished Member of the Family

## Chapter 10: The Confidence Game: Estimation

- Understanding Sampling Distributions

- An EXTREMELY Important Idea: The Central Limit Theorem
- Confidence: It Has Its Limits!
- Fit to a t

## Chapter 11: One-Sample Hypothesis Testing

- Hypotheses, Tests, and Errors
- Hypothesis Tests and Sampling Distributions
- Catching Some Z's Again
- Z Testing in R
- t for One
- t Testing in R
- Working with t-Distributions
- Visualizing t-Distributions
- Testing a Variance
- Working with Chi-Square Distributions
- Visualizing Chi-Square Distributions

## Chapter 12: Two-Sample Hypothesis Testing

- Hypotheses Built for Two
- Sampling Distributions Revisited
- t for Two
- Like Peas in a Pod: Equal Variances
- t-Testing in R
- A Matched Set: Hypothesis Testing for Paired Samples
- Paired Sample t-testing in R
- Testing Two Variances
- Working with F Distributions
- Visualizing F Distributions

## Chapter 13: Testing More than Two Samples

- Testing More than Two
- ANOVA in R
- Another Kind of Hypothesis, Another Kind of Test
- Getting Trendy
- Trend Analysis in R

## Chapter 14: More Complicated Testing

- Cracking the Combinations
- Two-Way ANOVA in R
- Two Kinds of Variables … at Once
- After the Analysis
- Multivariate Analysis of Variance

Chapter 15: Regression: Linear, Multiple, and the General Linear Model

- The Plot of Scatter
- Graphing Lines
- Regression: What a Line!
- Linear Regression in R
- Juggling Many Relationships at Once: Multiple Regression
- ANOVA: Another Look
- Analysis of Covariance: The Final Component of the GLM
- But Wait — There's More

Chapter 16: Correlation: The Rise and Fall of Relationships

- Understanding Correlation

- Correlation and Regression
- Testing Hypotheses about Correlation
- Correlation in R
- Multiple Correlation
- Partial Correlation
- Partial Correlation in R
- Semipartial Correlation
- Semipartial Correlation in R

## Chapter 17: Curvilinear Regression: When Relationships Get Complicated

- What Is a Logarithm?
- What Is e?
- Power Regression
- Exponential Regression
- Logarithmic Regression
- Polynomial Regression: A Higher Power
- Which Model Should You Use?

## Chapter 18: In Due Time

- A Time Series and Its Components
- Forecasting: A Moving Experience
- Forecasting: Another Way
- Working with Real Data

## Chapter 19: Non-Parametric Statistics

- Independent Samples
- Matched Samples
- Correlation: Spearman’s rS
- Correlation: Kendall’s Tau
- A Heads-Up

## Chapter 20: Introducing Probability

- What Is Probability?
- Compound Events
- Conditional Probability
- Large Sample Spaces
- R Functions for Counting Rules

- Random Variables: Discrete and Continuous
- Probability Distributions and Density Functions
- The Binomial Distribution
- The Binomial and Negative Binomial in R
- Hypothesis Testing with the Binomial Distribution
- More on Hypothesis Testing: R versus Tradition

## Chapter 21: Probability Meets Regression: Logistic Regression

- Getting the Data
- Doing the Analysis
- Visualizing the Results

## Chapter 22: Tools and Data for Machine Learning Projects

- The UCI (University of California-Irvine) ML Repository
- Introducing the Rattle package
- Using Rattle with iris

## Chapter 23: Decisions, Decisions, Decisions

- Decision Tree Components

- Decision Trees in R
- Decision Trees in Rattle
- Project: A More Complex Decision Tree
- Suggested Project: Titanic

## Chapter 24: Into the Forest, Randomly

- Growing a Random Forest
- Random Forests in R
- Project: Identifying Glass
- Suggested Project: Identifying Mushrooms

## Chapter 25: Support Your Local Vector

- Some Data to Work With
- Separability: It’s Usually Nonlinear
- Support Vector Machines in R
- Project: House Parties

## Chapter 26: K-Means Clustering

- How It Works

- K-Means Clustering in R
- Project: Glass Clusters

## Chapter 27: Neural Networks

- Networks in the Nervous System
- Artificial Neural Networks
- Neural Networks in R
- Project: Banknotes
- Suggested Projects: Rattling Around

## Chapter 28: Exploring Marketing

- Analyzing Retail Data
- Enter Machine Learning
- Suggested Project: Another Data Set

## Chapter 29: From the City That Never Sleeps

- Examining the Data Set
- Warming Up
- Quick Suggested Project: Airline Names

- Suggested Project: Departure Delays
- Quick Suggested Project: Analyze Weekday Differences
- Suggested Project: Delay and Weather

### Chapter 30: Working with a Browser

- Getting Your Shine On
- Creating Your First shiny Project
- Working with ggplot
- Another shiny Project
- Suggested Project

### Chapter 31: Dashboards — How Dashing!

- The shinydashboard Package
- Exploring Dashboard Layouts
- Working with the Sidebar
- Interacting with Graphics

## 11. Live Labs

The benefits of live-labs are:

- Exam based practical tasks
- Real equipment, absolutely no simulations
- Access to the latest industry technologies
- Available anytime, anywhere on any device
- Break and Reset functionality
- No hardware costs

## Lab Tasks

**R: What It Does and How It Does It**

- Performing Basic Operations
- Creating and Using Custom Functions
- Creating and Working with Data Frames
- Working with Matrices
- Using for Loops and if-else Statements

**Working with Packages, Importing, and Exporting**

- Analyzing Data

**Getting Graphic**

- Creating a Scatter Plot and a Box Plot
- Creating a Bar Plot and a Pie Graph
- Creating a Histogram and a Density Plot
- Creating a Grouped Bar Plot with ggplot2

**Finding Your Center**

- Calculating the Mean, Median, and Mode

**Deviating from the Average**

- Finding Variance and Standard Deviation

**Meeting Standards and Standings**

- Calculating Percentiles
- Finding Nth Smallest and Nth Largest Elements
- Handling Tied Ranks

**Summarizing It All**

- Calculating Skewness and Kurtosis in Data
- Analyzing Frequency in Data

**What's Normal?**

- Exploring Quantiles of a Normal Distribution
- Visualizing the Normal Distribution Curve

**The Confidence Game: Estimation**

- Simulating the Central Limit Theorem
- Calculating Confidence Intervals Using the T-Distribution

**One-Sample Hypothesis Testing**

- Performing the Z-Test
- Analyzing a T-Distribution

**Two-Sample Hypothesis Testing**

- Performing a Z-Test for Two Samples
- Performing a T-Test for Two Samples
- Visualizing F Distributions

**Testing More than Two Samples**

- Performing Repeated Measures ANOVA
- Performing Trend Analysis

**More Complicated Testing**

- Performing Two-Way ANOVA
- Performing Mixed ANOVA

**Regression: Linear, Multiple, and the General Linear Model**

- Creating a Linear Regression Model
- Creating a Multiple Regression Model
- Performing ANCOVA

**Correlation: The Rise and Fall of Relationships**

- Performing Correlation Analysis
- Performing Partial Correlation Analysis

**Curvilinear Regression: When Relationships Get Complicated**

- Creating a Power Regression Model
- Creating an Exponential Regression Model
- Creating a Logarithmic Regression Model
- Creating a Polynomial Regression Model

**In Due Time**

- Analyzing Time Series Data
- Creating Forecasts Using Moving Averages

**Non-Parametric Statistics**

- Performing the Kruskal-Wallis Rank-Sum Test
- Performing the Wilcoxon Rank-Sum Test
- Performing the Cochran’s Q Test
- Performing the Friedman Rank-Sum Test

**Introducing Probability**

- Exploring Binomial Distribution

**Probability Meets Regression: Logistic Regression**

- Creating a Logistic Regression Model

**Tools and Data for Machine Learning Projects**

- Performing EDA

**Decisions, Decisions, Decisions**

- Creating a Decision Tree Model

**Into the Forest, Randomly**

- Creating a Random Forest Model

**Support Your Local Vector**

- Creating an SVM Model

**K-Means Clustering**

- Creating Clusters

**Neural Networks**

- Creating a Neural Network Model

**Exploring Marketing**

- Performing RFM Analysis

**From the City That Never Sleeps**

- Performing Advanced Data Analysis

**Working with a Browser**

- Analyzing Data Using the shiny App

**Dashboards — How Dashing!**

- Creating a shiny Dashboard

## Here's what you get

| 57 | 57 | 02:39 |
|---|---|---|
| LIVE LABS | VIDEO TUTORIALS | HOURS |

You can’t stay away! Get

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