

uCertify

Course Outline

**An Introduction to Statistical Learning with
Applications in R**



04 Aug 2025

1. Exercises, Quizzes, Flashcards & Glossary

Number of Questions

2. Expert Instructor-Led Training

3. ADA Compliant & JAWS Compatible Platform

4. State of the Art Educator Tools

5. Award Winning Learning Platform (LMS)

6. Chapter & Lessons

Syllabus

Chapter 1: Preface

Chapter 2: Introduction

Chapter 3: Statistical Learning

Chapter 4: Linear Regression

Chapter 5: Classification

Chapter 6: Resampling Methods

Chapter 7: Linear Model Selection and Regularization

Chapter 8: Moving Beyond Linearity

Chapter 9: Tree-Based Methods

Chapter 10: Support Vector Machines

Chapter 11: Deep Learning

Chapter 12: Survival Analysis and Censored Data

Chapter 13: Unsupervised Learning

Chapter 14: Multiple Testing

Videos and How To

7. Live labs

Lab Tasks

Here's what you get

1. 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.

2. 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.

3. 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.

4. 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

5. 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: Preface

Chapter 2: Introduction

- An Overview of Statistical Learning

- A Brief History of Statistical Learning
- This Course
- Who Should Read This Course?
- Notation and Simple Matrix Algebra
- Organization of This Course
- Data Sets Used in Labs and Exercises

Chapter 3: Statistical Learning

- What Is Statistical Learning?
- Assessing Model Accuracy
- Lab: Introduction to R
- Exercises

Chapter 4: Linear Regression

- Simple Linear Regression
- Multiple Linear Regression
- Other Considerations in the Regression Model
- The Marketing Plan
- Comparison of Linear Regression with K-Nearest Neighbors

- Lab: Linear Regression
- Exercises

Chapter 5: Classification

- An Overview of Classification
- Why Not Linear Regression?
- Logistic Regression
- Generative Models for Classification
- A Comparison of Classification Methods
- Generalized Linear Models
- Lab: Classification Methods
- Exercises

Chapter 6: Resampling Methods

- Cross-Validation
- The Bootstrap
- Lab: Cross-Validation and the Bootstrap
- Exercises

Chapter 7: Linear Model Selection and Regularization

- Subset Selection
- Shrinkage Methods
- Dimension Reduction Methods
- Considerations in High Dimensions
- Lab: Linear Models and Regularization Methods
- Exercises

Chapter 8: Moving Beyond Linearity

- Polynomial Regression
- Step Functions
- Basis Functions
- Regression Splines
- Smoothing Splines
- Local Regression
- Generalized Additive Models
- Lab: Non-linear Modeling
- Exercises

Chapter 9: Tree-Based Methods

- The Basics of Decision Trees
- Bagging, Random Forests, Boosting, and Bayesian Additive Regression Trees
- Lab: Decision Trees
- Exercises

Chapter 10: Support Vector Machines

- Maximal Margin Classifier
- Support Vector Classifiers
- Support Vector Machines
- SVMs with More than Two Classes
- Relationship to Logistic Regression
- Lab: Support Vector Machines
- Exercises

Chapter 11: Deep Learning

- Single Layer Neural Networks
- Multilayer Neural Networks

- Convolutional Neural Networks
- Document Classification
- Recurrent Neural Networks
- When to Use Deep Learning
- Fitting a Neural Network
- Interpolation and Double Descent
- Lab: Deep Learning
- Exercises

Chapter 12: Survival Analysis and Censored Data

- Survival and Censoring Times
- A Closer Look at Censoring
- The Kaplan-Meier Survival Curve
- The Log-Rank Test
- Regression Models With a Survival Response
- Shrinkage for the Cox Model
- Additional Topics
- Lab: Survival Analysis

- Exercises

Chapter 13: Unsupervised Learning

- The Challenge of Unsupervised Learning
- Principal Components Analysis
- Missing Values and Matrix Completion
- Clustering Methods
- Lab: Unsupervised Learning
- Exercises

Chapter 14: Multiple Testing

- A Quick Review of Hypothesis Testing
- The Challenge of Multiple Testing
- The Family-Wise Error Rate
- The False Discovery Rate
- A Re-Sampling Approach to p-Values and False Discovery Rates
- Lab: Multiple Testing
- Exercises

6. 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

Introduction

- Analyzing Stock Market Trends Using the Smarket Dataset from ISLR
- Analyzing Wage Data Using the ISLR Package

Statistical Learning

- Implementing the Bayes Classifier
- Implementing the Bias-Variance Trade-Off
- Indexing Data

Linear Regression

- Implementing Simple Linear Regression
- Performing Multiple Linear Regression
- Implementing Qualitative Predictors Using the Credit Dataset from ISLR
- Implementing Non-linear Transformations of Predictors

Classification

- Implementing Multinomial Logistic Regression
- Implementing Multiple Logistic Regression
- Implementing Naive Bayes Classification
- Implementing Quadratic Discriminant Analysis
- Generating and Visualizing Multivariate Gaussian Distribution
- Implementing Linear Discriminant Analysis
- Implementing the Generalized Linear Model
- Implementing Poisson Regression
- Implementing K-Nearest Neighbors on the Caravan Dataset from ISLR

Resampling Methods

- Implementing the Validation Set Approach with the Auto Dataset from ISLR
- Implementing Leave-One-Out Cross-Validation
- Implementing K-Fold Cross-Validation
- Understanding Bootstrapping Techniques on the Portfolio Dataset from ISLR

Linear Model Selection and Regularization

- Implementing Subset Selection Methods Using the Hitters Dataset from ISLR
- Implementing Forward and Backward Stepwise Selection
- Implementing Lasso Regression
- Implementing Ridge Regression
- Implementing Partial Least Squares
- Improving Predictions with Principal Components Regression

Moving Beyond Linearity

- Implementing Polynomial Regression
- Implementing Step Functions
- Implementing Splines
- Improving Generalized Additive Models

Tree-Based Methods

- Implementing Bagging and Random Forests
- Fitting Regression Trees

- Improving Model Performance Using Boosting
- Building and Analyzing Classification Trees Using the Carseats Dataset from ISLR

Support Vector Machines

- Implementing the Maximal Margin Classifier
- Introducing ROC Curves
- Implementing Support Vector Classifier
- Implementing SVM with Multiple Classes

Deep Learning

- Implementing RNN for Time Series Prediction
- Creating an Image Classifier Using CNNs
- Implementing RNN for Time Series Prediction

Survival Analysis and Censored Data

- Implementing the Kaplan-Meier Survival Curve
- Applying the Log-Rank Test
- Incorporating Shrinkage Techniques into the Cox Model

Unsupervised Learning

- Implementing a Dendrogram
- Implementing K-Means Clustering
- Analyzing the NCI60 Data using the ISLR Package

Multiple Testing

- Implementing Family-Wise Error Rate
- Implementing Holm's Step-Down Procedure
- Implementing the Benjamini-Hochberg Procedure
- Implementing the False Discovery Rate

Here's what you get

52

LIVE LABS

52

VIDEO TUTORIALS

01:14

HOURS

You can't stay away! Get

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