uCertify

Course Outline

Statistics For Machine Learning

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 to Statistics

   Chapter 3: Descriptive Statistics

   Chapter 4: Random Variables

   Chapter 5: Probability

   Chapter 6: Parameter Estimation

   Chapter 7: Hypothesis Testing

   Chapter 8: Analysis of Variance

   Chapter 9: Regression

   Chapter 10: Data Analysis Using Python

   Chapter 11: Non-Parametric Statistics

   Chapter 12: Introduction to Machine Learning

   Videos and How To

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 to Statistics

- Population and Sample
- Introduction to Random Variables
- Other variables
- Introduction to Descriptive Statistics
- Visualizations
- Conclusion

Chapter 3: Descriptive Statistics

- Measures of Central Tendency
- Measures of dispersion
- The Strength of the relationship between variables
- Conclusion

Chapter 4: Random Variables

- Random Variables
- Discrete Random Variables
- Continuous Random Variables
- Joint Distributions
- Independent Random Variables
- Marginal and Conditional Distributions
- Definition of Mathematical Expectation
- Properties of Mathematical Expectation
- Chebyshev’s Inequality
- Law of large numbers
- Conclusion

Chapter 5: Probability

- Introduction
- Properties of probability
- Some other terminologies
- Conditional probability
- Bayes’s theorem
- Probability distributions
- Conclusion

Chapter 6: Parameter Estimation

- Parameter estimation
- Point estimate – The mathematics way
- Sampling distributions
- Central Limit Theorem
- Estimators having bias component
- The variance of a point estimate
- Standard Error of Estimator
- Mean Squared Error of Estimator

- Methods to Determine Point Estimates
- Confidence Intervals
- Conclusion

Chapter 7: Hypothesis Testing

- Hypothesis
- Hypothesis Testing
- Confidence Interval
- Types of Hypothesis
- Null Hypothesis
- Alternative Hypothesis
- P-Value
- Steps in hypothesis testing
- Use Case
- Z-test
- T-test
- One-sample T-test
- Two-sample T-test
- Paired T-test

- Chi-Square test
- Test of Goodnessoffit
- Independence test
- Conclusion

Chapter 8: Analysis of Variance

- Introduction to ANOVA
- One-way ANOVA test
- Calculation of Mean Square due to Error
- Calculation of Mean Square due to Treatment
- Decision Rule
- Tukey test
- Two-way ANOVA
- Main Effects
- Interaction Effects
- Multivariate Analysis of Variance (MANOVA)
- Wilks’ Lambda test
- Lawley Hotelling Trace

- Pillai’s Trace
- Roy’s Largest Root
- Conclusion

Chapter 9: Regression

- Simple Linear Regression
- Finding the Values of ?0 and ?1
- Standard Error
- Confidence Intervals
- Unimportant Variable
- Accuracy of Prediction
- Data Pre-processing
- Multiple Linear Regression
- Polynomial Regression
- Subset Selection Method
- Ridge Regression
- Lasso Regression
- ElasticNet Regression
- Logistic Regression

- Estimation of Parameters
- Understanding Residuals
- Patterns of Residuals
- Multicollinearity
- Conclusion

Chapter 10: Data Analysis Using Python

- Pandas
- Importing and Reading a CSV Sheet
- Basic Exploration of Data
- Converting a Python Data Structure to Data Frame
- Numerical Description of a Data Frame
- Adding Conditions in Pandas
- Extending Extractions – loc and iloc
- Understanding the iloc() Function
- Understanding the loc() Function
- Tackling Null Values
- Concatenating Data Frames

- Merging Data Frames
- Left Join
- Right Join
- Outer Join
- Inner Join
- Reading and Writing Excel Sheets
- Exploring Groupby
- Binning in Pandas
- Pandas Series
- NumPy
- Creating Null Vector
- Indexing
- Reshaping a Numpy Array
- Generating Random Values Using Numpy
- Descriptive statistics using Numpy
- Mathematical Operations Using Numpy
- Other important features in Numpy
- Conclusion

Chapter 11: Non-Parametric Statistics

- The test for randomness
- Sign Tests
- One-sample Sign Test
- Wilcoxon Test
- Mann Whitney Test
- Spearman Rank Correlation Test
- Kruskal Wallis test
- Conclusion

Chapter 12: Introduction to Machine Learning

- Machine Learning
- Supervised Learning
- K-Nearest Neighbour
- Naive Bayes Theorem
- Decision trees
- Ensemble trees
- Support Vector Machines

- Python application
- Unsupervised Learning
- K-Means Clustering
- Hierarchical Clustering
- Principal Component Analysis
- Conclusion

You can’t stay away! Get

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