

uCertify

Course Outline

Learn Data Science from Scratch



26 Apr 2025

1. Pre-Assessment
2. Exercises, Quizzes, Flashcards & Glossary
Number of Questions
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
Syllabus
Chapter 1: Introduction
Chapter 2: Unraveling the Data Science Universe: An Introduction
Chapter 3: Essential Python Libraries and Tools for Data Science
Chapter 4: Statistics and Probability Essentials for Data Science
Chapter 5: Data Mining Expedition: Web Scraping and Data Collection Techniques
Chapter 6: Painting with Data: Exploration and Visualization
Chapter 7: Data Alchemy: Cleaning and Preprocessing Raw Data
Chapter 8: Machine Learning Magic: An Introduction to Predictive Modeling
Chapter 9: Exploring Regression: Linear, Logistic, and Advanced Methods
Chapter 10: Unveiling Patterns with k-Nearest Neighbors and Naïve Bayes
Chapter 11: Exploring Tree-Based Models: Decision Trees to Gradient Boosting
Chapter 12: Support Vector Machines: Simplifying Complexity
Chapter 13: Dimensionality Reduction: From PCA to Advanced Methods
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Chapter 16: Word Play: Text Analytics and Natural Language Processing
Chapter 17: Crafting Recommender Systems
Chapter 18: Data Storage Mastery: Databases and Efficient Data Management
Chapter 19: Data Science in Action: A Comprehensive End-to-end Project

Videos and How To

8. Practice Test

Here's what you get

Features

9. Performance Based labs

Lab Tasks

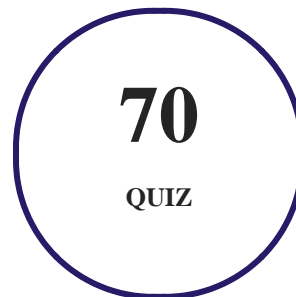
Here's what you get

1. Pre-Assessment

Pre-Assessment lets you identify the areas for improvement before you start your prep. It determines what students know about a topic before it is taught and identifies areas for improvement with question assessment before beginning the course.

2. 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.



3. 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.

4. 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.

5. 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.

6. 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

7. 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

Chapter 2: Unraveling the Data Science Universe: An Introduction

- Introduction
- What is data science
- Data science: A fusion of fields
- History and evolution of data science as a field
- The data science process
- A day in the life of a data scientist

- How data science is shaping our world
- Differences between Artificial Intelligence, big data, and data science
- Conclusion
- Points to remember
- Questions

Chapter 3: Essential Python Libraries and Tools for Data Science

- Introduction
- Setting up your developer environment
- Basics of NumPy
- Pandas for data manipulation
- Matplotlib, seaborn, and Plotly for data visualization
- Jupyter Notebook essentials
- Scikit-learn: Key to streamlined Machine Learning
- Conclusion
- Points to remember
- Questions

Chapter 4: Statistics and Probability Essentials for Data Science

- Introduction
- Probability theory
- Basic probability concepts
- Conditional probability and Bayes' theorem
- Discrete and continuous random variables
- Expectation, variance, and covariance of random variables
- Distributions and sampling
- Central limit theorem
- Sampling techniques
- Hypothesis testing
- Conclusion
- Points to remember
- Questions

Chapter 5: Data Mining Expedition: Web Scraping and Data Collection Techniques

- Introduction
- Sources of data
- Web scraping with BeautifulSoup and Requests

- APIs and Python libraries for data collection
- Ethical considerations during data collection
- Conclusion
- Points to remember
- Questions

Chapter 6: Painting with Data: Exploration and Visualization

- Introduction
- Exploratory data analysis
- Descriptive statistics
- Data visualization with Matplotlib, seaborn, and Plotly
- Discovering trends and relationships
- Conclusion
- Points to remember
- Questions

Chapter 7: Data Alchemy: Cleaning and Preprocessing Raw Data

- Introduction

- Handling missing data
- Data transformation and normalization
- Addressing duplication and data inconsistencies
- Feature engineering and selection
- Encoding categorical features
- Conclusion
- Points to remember
- Questions

Chapter 8: Machine Learning Magic: An Introduction to Predictive Modeling

- Introduction
- Supervised and unsupervised learning
- Essential algorithms and model selection
- Training, testing, and evaluation'
- Overfitting and underfitting
- Conclusion
- Points to remember
- Questions

Chapter 9: Exploring Regression: Linear, Logistic, and Advanced Methods

- Introduction
- Linear regression
- Logistic regression
- Harnessing regularization: Techniques to rein in your model
- Conclusion
- Points to remember
- Questions

Chapter 10: Unveiling Patterns with k-Nearest Neighbors and Naïve Bayes

- Introduction
- Understanding the k-Nearest Neighbors algorithm
- Naïve Bayes classifier
- Hyperparameter tuning
- Conclusion
- Points to remember
- Questions

Chapter 11: Exploring Tree-Based Models: Decision Trees to Gradient Boosting

- Introduction
- Decision trees
- Entropy and information gain
- Tree pruning and optimization
- The power of ensemble methods in machine learning
- Conclusion
- Points to remember
- Questions

Chapter 12: Support Vector Machines: Simplifying Complexity

- Introduction
- Introduction to support vector machines
- Understanding kernel methods
- SVM for classification and regression roles
- Real-world SVM: From preprocessing to evaluation
- Balancing the bias-variance trade-off in SVM
- Conclusion
- Points to remember

- Questions

Chapter 13: Dimensionality Reduction: From PCA to Advanced Methods

- Introduction
- Understanding the problem of high dimensionality
- Principal component analysis
- Visualizing high-dimensional data
- Exploring beyond PCA: t-SNE and UMAP
- Conclusion
- Points to remember
- Questions

Chapter 14: Unlocking Unsupervised Learning

- Introduction
- K-means clustering
- Hierarchical clustering
- Understanding DBSCAN: A comprehensive guide
- DBSCAN and other density-based methods

- Cluster evaluation and validation
- Conclusion
- Points to remember
- Questions

Chapter 15: The Essence of Neural Networks and Deep Learning

- Introduction
- Deep learning: Beyond conventional machine learning
- Deep learning as artificial intelligence's game changer
- Data and processing power
- Introduction to deep learning libraries
- The intricate web of artificial neural networks
- Importance of data and feature engineering in deep learning
- Feature crafting versus self-learning
- Overfitting: A deep learning perspective
- Convolutional neural networks
- Recurrent neural networks
- Long short-term memory networks

- Conclusion
- Points to remember
- Questions

Chapter 16: Word Play: Text Analytics and Natural Language Processing

- Introduction
- Text processing and tokenization
- The transformation journey: From text to features
- Decoding emotions: Sentiment analysis and text classification
- Topic modeling and entity recognition
- Conclusion
- Points to remember
- Questions

Chapter 17: Crafting Recommender Systems

- Introduction
- Introduction to collaborative filtering
- User-based collaborative filtering
- Decoding item-based collaborative filtering

- Measuring similarities in recommender systems
- Sparsity and scalability in collaborative filtering
- Building your first collaborative filtering systems in Python
- Personalized proposals: Understanding content-based filtering
- Building content based recommendations in Python
- Matrix factorization and SVD in recommender system
- Synergy in recommendation: Hybrid systems
- Crafting a hybrid recommender with Python: Step-by-step guide
- Conclusion
- Points to remember
- Questions

Chapter 18: Data Storage Mastery: Databases and Efficient Data Management

- Introduction
- Exploring database types: Relational and NoSQL databases
- Diversifying your data storage: NoSQL databases
- Python meets SQL: Mastering database interaction
- Navigating databses in Python: SQLAlchemy, SQLite3, PyMango

- Python data format handling: CSV, JSON, XML, Parquet, Excel
- Unpacking serialization: Moving and storing data efficiently
- Data warehouses and data lakes: A comprehensive guide
- Conclusion
- Points to remember
- Questions

Chapter 19: Data Science in Action: A Comprehensive End-to-end Project

- Introduction
- Defining a data science problem
- Data collection and preparation
- From selection to evaluation: Charting the model's journey
- Communication of results
- Deployment, monitoring and maintenance of a model
- Conclusion
- Points to remember

8. Practice Test

Here's what you get

Features

Each question comes with detailed remediation explaining not only why an answer option is correct but also why it is incorrect.

Unlimited Practice

Each test can be taken unlimited number of times until the learner feels they are prepared. Learner can review the test and read detailed remediation. Detailed test history is also available.

Each test set comes with learn, test and review modes. In learn mode, learners will attempt a question and will get immediate feedback and complete remediation as they move on to the next question. In test mode, learners can take a timed test simulating the actual exam conditions. In review mode, learners can read through one item at a time without attempting it.

9. Performance Based Labs

uCertify's performance-based labs are simulators that provides virtual environment. Labs deliver hands on experience with minimal risk and thus replace expensive physical labs. uCertify Labs are cloud-based, device-enabled and can be easily integrated with an LMS. Features of uCertify labs:

- Provide hands-on experience in a safe, online environment
- Labs simulate real world, hardware, software & CLI environment
- Flexible and inexpensive alternative to physical Labs
- Comes with well-organized component library for every task
- Highly interactive - learn by doing
- Explanations and remediation available
- Videos on how to perform

Lab Tasks

Here's what you get

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