uCertify

Course Outline

IoT Data Analytics using Python

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: Necessity of Analytics Across IoT

   Chapter 3: Up and Running with Data Analytics Fundamentals

   Chapter 4: Setting Up IoT Analytics Environment

   Chapter 5: Managing Data Pipeline and Cleaning

   Chapter 6: Designing Data Lake and Executing Data Transformation

   Chapter 7: Implementing Descriptive Analytics Using Pandas

   Chapter 8: Time Series Forecasting and Predictions

   Chapter 9: Monitoring and Preventive Maintenance

   Chapter 10: Model Deployment on Edge Devices

   Chapter 11: Understanding Edge Computing with MicroPython

   Chapter 12: IoT Analytics for Self -driving Vehicles

   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: Necessity of Analytics Across IoT

- Introduction
- Internet of Things and Industrial Internet of Things
- Industrial Revolution and Industry 4.0
- IoT Data Analytics
- IoT Data Analytics for Digital Transformation
- Hardware Devices for IoT Data Analytics

- Data Pipeline for Analytics
- Python: The Go-to Language for Analytics
- Conclusion
- Points to Remember

Chapter 3: Up and Running with Data Analytics Fundamentals

- Introduction
- Data Analysis Methods and Frameworks
- How to Perform Data Analysis
- Conclusion
- Points to Remember

Chapter 4: Setting Up IoT Analytics Environment

- Introduction
- Why Python Language
- Installation and Configuration of Python IDE
- Installation and Configuration of Apache Kafka
- Installation and Configuration of MQTT
- Installation and Configuration of PostgresSQL

- Important Python Packages Used
- Basics of Python Language with Examples
- Data Analysis using Python
- Data Wrangling with Python
- Data Visualization using Python
- Conclusion
- Points to Remember

Chapter 5: Managing Data Pipeline and Cleaning

- Introduction
- IoT Data Formats
- Realtime Streaming and Data Pipeline
- IoT Dataflow
- Data Simulation and Digital Twin
- Data Simulation
- Digital Twin
- IoT Simulator Tools
- IoT Data Simulator Python Implementation
- Data Cleansing Implementation in Python

- Data Transformation Rule Implementation in Python
- Conclusion
- Points to Remember

Chapter 6: Designing Data Lake and Executing Data Transformation

- Introduction
- Data Lake Concept
- IoT Real-time Data Streaming
- Building Data Pipeline to the Raw Zone
- Transformation Zone of the Data Lake
- Building KPIs and Metrics
- Conclusion
- Points to Remember

Chapter 7: Implementing Descriptive Analytics Using Pandas

- Introduction
- Descriptive Data Analysis
- Download Wind Turbine Dataset
- Time Series Analysis

- Testing Methods for Time Series Data
- Conclusion
- Points to Remember

Chapter 8: Time Series Forecasting and Predictions

- Introduction
- Data Smoothing
- Data Lag Identification
- Autocorrelation and Partial Autocorrection
- Forecasting using AR Model
- Moving Average
- ARIMA
- Time Series Feature Extraction
- Automatic Time Series
- Storing Wind Turbine Predictions
- Analytical Base Table
- Conclusion
- Points to Remember

Chapter 9: Monitoring and Preventive Maintenance

- Introduction
- Condition Monitoring
- Condition Based Maintenance
- Corrective Maintenance
- Preventive Maintenance
- Text Mining the Product Manual
- Automating the Creation of Maintenance Ticket
- Conclusion
- Points to Remember

Chapter 10: Model Deployment on Edge Devices

- Introduction
- Objectives
- Introduction to Edge Computing and Analytics
- Simulators for IoT Systems
- Installation and Configuration of Edge Devices
- Installation and Configuration of FastAPI

- Model Building and Reuse
- Expose Models using FastAPI
- Deploying Machine Learning Model
- Concept of Continuous Learning
- Concept of Adaptive Learning
- Conclusion
- Points to Remember

Chapter 11: Understanding Edge Computing with MicroPython

- Introduction
- Concepts of Edge Computing
- Concepts of Edge Analytics
- Introduction to Edge Platform
- Data Flow from Edge to Cloud
- Use Cases for Edge Analytics
- MicroPython for Edge Computing
- Invoking ML Models using MicroPython
- Conclusion
- Points to Remember

Chapter 12: IoT Analytics for Self -driving Vehicles

- Introduction
- CRISP-DM Framework
- Business Understanding of Self-driving Vehicles
- Data Collection and Understanding
- Data Preparation and Feature Engineering
- Modeling and Evaluation
- Deployment of Machine Learning Models
- Conclusion
- Points to Remember

You can’t stay away! Get in touch with our team to

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