Python for Data Science, AI & Development

by IBM

About this Course
Kickstart your learning of Python with this beginner-friendly self-paced course taught by an expert. Python is one of the most popular languages in the programming and data science world and demand for individuals who have the ability to apply Python has never been higher.

This introduction to Python course will take you from zero to programming in Python in a matter of hours—no prior programming experience necessary! You will learn about Python basics and the different data types. You will familiarize yourself with Python Data structures like List and Tuples, as well as logic concepts like conditions and branching. You will use Python libraries such as Pandas, Numpy & Beautiful Soup. You'll also use Python to perform tasks such as data collection and web scraping with APIs.

You will practice and apply what you learn through hands-on labs using Jupyter Notebooks. By the end of this course, you'll feel comfortable using basic programs, working with data, and automating real-world tasks using Python.

This course is suitable for anyone who wants to learn Data Science, Data Analytics, Software Development, Data Engineering, AI, and DevOps as well as a number of other job roles.

Show less

Taught by: **Joseph Santarcangelo**, Ph.D., Data Scientist at IBM
IBM Developer Skills Network

Basic Info	Course 2 of 16 in the IBM Data Engineering Specialization
Level	Beginner
Commitment	5 weeks of study, 3-6 hours per week
Language	English, **Subtitles:** Arabic, French, Bengali, Ukrainian, Chinese (Simplified), Greek, Italian, Portuguese (Brazil), Dutch, Korean, German, Pashto, Urdu, Russian, Thai, Indonesian, Swedish, Turkish, Azerbaijani, Spanish, Dari, Hindi, Japanese, Kazakh, Hungarian, Polish
How To Pass	Pass all graded assignments to complete the course.
User Ratings	Average User Rating 4.6

Syllabus

Module 1

Python Basics

This module teaches the basics of Python and begins by exploring some of the different data types such as integers, real numbers, and strings. Continue with the module and learn how to use expressions in mathematical operations, store values in variables, and the many different ways to manipulate strings.

6 videos, 5 readings

1. **Video:** Course Introduction
2. **Reading:** About this course
3. **Reading:** Course Overview
4. **Reading:** Helpful Tips for Course Completion
5. **Video:** Introduction to Python
6. **Reading:** Introduction to Jupyter
7. **Video:** Getting Started with Jupyter
8. **App Item:** Hands-on Lab: Write Your First Program
9. **Video:** Types
10. **App Item:** Hands-on Lab: Types
11. **Graded Assignment:** Practice Quiz: Types
12. **Video:** Expressions and Variables
13. **App Item:** Hands-on Lab: Expression and Variables
14. **Graded Assignment:** Practice Quiz: Expressions and Variables
15. **Video:** String Operations
16. **Ungraded Plugin:** (Optional) Reading: Format Strings in Python
17. **App Item:** Hands-On Lab: String Operations
18. **Graded Assignment:** Practice Quiz: String Operations
19. **Reading:** Module 1 Summary: Python Basics
20. **Ungraded Plugin:** Cheat Sheet: Python Basics
21. **Ungraded Plugin:** Module 1 Glossary: Python Basics

Show less

Graded: Module 1 Graded Quiz: Python Basics

Module 2

Python Data Structures

This module begins a journey into Python data structures by explaining the use of lists and tuples and how they are able to store collections of data in a single variable. Next learn about dictionaries and how they function by storing data in pairs of keys and values, and end with Python sets to learn how this type of collection can appear in any order and will only contain unique elements.

3 videos, 1 reading

1. **Video:** Lists and Tuples
2. **App Item:** Hands-On Lab: Lists
3. **App Item:** Hands-On Lab: Tuples
4. **Ungraded Plugin:** Cheat Sheet: Lists and Tuples
5. **Graded Assignment:** Practice Quiz: Lists and Tuples
6. **Video:** Dictionaries
7. **App Item:** Hands-On Lab: Dictionaries
8. **Graded Assignment:** Practice Quiz: Dictionaries
9. **Video:** Sets
10. **App Item:** Hands-On Lab: Sets
11. **Graded Assignment:** Practice Quiz: Sets
12. **Reading:** Module 2 Summary: Python Data Structures
13. **Ungraded Plugin:** CheatSheet: Dictionaries & Sets
14. **Ungraded Plugin:** Module 2 Glossary: Python Data Structures

Show less

Graded: Module 2 Graded Quiz: Python Data Structures

Module 3

Python Programming Fundamentals

This module discusses Python fundamentals and begins with the concepts of conditions and branching. Continue through the module and learn how to implement loops to iterate over sequences, create functions to perform a specific task, perform exception handling to catch errors, and how classes are needed to create objects.

5 videos, 1 reading

1. **Video:** Conditions and Branching
2. **App Item:** Hands-On Lab: Conditions and Branching
3. **Ungraded Plugin:** Reading: Conditions and Branching
4. **Graded Assignment:** Practice Quiz: Conditions and Branching
5. **Video:** Loops
6. **Ungraded Plugin:** Reading: Introduction to Loops in Python
7. **App Item:** Hands-On Lab: Loops
8. **Graded Assignment:** Practice Quiz: Loops
9. **Video:** Functions
10. **Ungraded Plugin:** Reading: Exploring Python Functions
11. **App Item:** Hands-On Lab: Functions
12. **Graded Assignment:** Practice Quiz: Functions
13. **Video:** Exception Handling
14. **Ungraded Plugin:** Reading: Exception Handling
15. **App Item:** Hands-On Lab: Exception Handling
16. **Graded Assignment:** Practice Quiz: Exception Handling
17. **Video:** Objects and Classes
18. **Ungraded Plugin:** Reading: Objects and Classes
19. **App Item:** Hands-On Lab: Objects and Classes
20. **Graded Assignment:** Practice Quiz: Objects and Classes
21. **App Item:** Practice Lab: Text Analysis
22. **Reading:** Module 3 Summary: Python Programming Fundamentals
23. **Ungraded Plugin:** Cheat Sheet: Python Programming Fundamentals
24. **Ungraded Plugin:** Module 3 Glossary: Python Programming Fundamentals

Show less

Graded: Module 3 Graded Quiz: Python Programming Fundamentals

Module 4

Working with Data in Python

This module explains the basics of working with data in Python and begins the path with learning how to read and write files. Continue the module and uncover the best Python libraries that will aid in data manipulation and mathematical operations.

6 videos, 1 reading

1. **Video:** Reading Files with Open
2. **Ungraded Plugin:** Reading: Reading Files with Open
3. **App Item:** Hands-On Lab: Reading Files with Open
4. **Video:** Writing Files with Open
5. **Ungraded Plugin:** Reading: Writing Files with Open
6. **App Item:** Hands-On Lab: Writing Files with Open
7. **Graded Assignment:** Practice Quiz: Reading and Writing Files with Open
8. **Video:** Pandas: Loading Data
9. **Video:** Pandas: Working with and Saving Data
10. **Ungraded Plugin:** Reading: Pandas
11. **App Item:** Practice Lab: Selecting Data in a DataFrame
12. **App Item:** Hands on Lab: Loading Data with Pandas
13. **Graded Assignment:** Practice Quiz: Pandas
14. **Video:** One Dimensional Numpy
15. **App Item:** Hands-On Lab: One Dimensional Numpy
16. **Ungraded Plugin:** Reading: Matrix Mathematics
17. **Video:** Two Dimensional Numpy
18. **App Item:** Hands-On Lab: Two Dimensional Numpy
19. **Ungraded Plugin:** Reading: Beginner's Guide to NumPy
20. **Ungraded Plugin:** Reading: Some Context on APIs
21. **Graded Assignment:** Practice Quiz: Numpy in Python
22. **Reading:** Module 4 Summary: Working with Data in Python
23. **Ungraded Plugin:** Cheat Sheet: Working with Data in Python
24. **Ungraded Plugin:** Module 4 Glossary: Working with Data in Python

Show less

Graded: Module 4 Graded Quiz: Working with Data in Python

Module 5

APIs and Data Collection

This module delves into the unique ways to collect data by the use of APIs and web scraping. It further explores data collection by explaining how to read and collect data when dealing with different file formats.

6 videos, 3 readings

1. **Video:** Application Program Interface
2. **App Item:** Hands-On Lab: Introduction to API
3. **App Item:** Practice Project: GDP Data Extraction and Processing
4. **Graded Assignment:** Practice Quiz: Simple APIs
5. **Video:** REST APIs & HTTP Requests - Part 1
6. **Video:** REST APIs & HTTP Requests - Part 2
7. **Ungraded Plugin:** Reading: Web Scraping and HTML Basics
8. **App Item:** Hands-on Lab: Access REST APIs & Request HTTP
9. **App Item:** Hands-On Lab: API Examples
10. **Video:** (Optional) HTML for Web Scraping
11. **Video:** (Optional) Web Scraping
12. **Ungraded Plugin:** Reading: Web Scraping - A Key Tool in Data Science
13. **Ungraded Plugin:** Reading: Web Scraping Tables using Pandas
14. **App Item:** Hands-on Lab: Web Scraping
15. **Video:** Working with Different File Formats
16. **App Item:** Hands-on Lab: Working with different file formats
17. **Graded Assignment:** Practice Quiz: REST APIs, Web Scraping, and Working with Files
18. **Reading:** Module 5 Summary: APIs and Data Collection
19. **Ungraded Plugin:** Cheat Sheet: APIs and Data Collection
20. **Ungraded Plugin:** Module 5 Glossary: APIs and Data Collection
21. **Reading:** Congratulations and Next Steps
22. **Reading:** Python Cheat Sheet: The Basics

Show less

Graded: Module 5 Graded Quiz: APIs and Data Collection

Graded: Final Exam for the Course

View Less

How It Works

General

How do I pass?

To earn your Certificate, you'll need to earn a passing

More

Course 2 of Specialization

Prepare for a career as a Data Engineer
Build job-ready skills – and must-have AI skills – for an in-demand career. Earn a credential from IBM. No prior experience required.

IBM Data Engineering
IBM

Learn More

View the course in catalog