PYTHON CHARMERS®

INTERMEDIATE PYTHON FOR DEVELOPERS

COURSE GUIDE (V1): OCTOBER - DECEMBER 2020

Intermediate Python for Developers

A specialist course

Audience: Python developers who want to improve their mastery of the language for real-world application development.

Prerequisites: Prior completion of Python Charmers' Introduction to Python course or equivalent Python experience (6+ months of daily use if self-taught).

Overview: Python is now used by developers worldwide for a wide range of applications. This course will teach you in-depth about its powerful language features, best practices for Python app development in teams, and how to use Python for building and maintaining API services, back-end websites, and interactive web-based dashboards.

Format: Live instructor-led training (online). Each topic is a mixture of expert instruction, worked examples, and hands-on exercises with help from the instructor(s).

Expert instructors: See bios below.

Duration: 4 days

Price: AUD $3,000 (excl GST)

Dates (October – December 2020):
   23–26 November 2020

Skills & Activities

Skills

Days 1–2: You will learn about powerful Python features and best practices for writing maintainable code in teams.

Days 3–4: You will learn about creating RESTful APIs in Python, including handling requests and sessions and interfacing with databases. You will also learn about templating and creating dynamic websites and interactive web-based dashboards, as well as debugging, deploying, and scaling them.

Overall: You will gain in-depth understanding and useful practical experience in a popular and powerful language and technology stack (Python / Flask / SQLAlchemy / Dash). This will help you immediately to contribute more to any Python development team.

Activities

Worked examples: Follow along yourself with each topic. No slides.

Exercises: There will be practical exercises throughout the course. These are designed to be challenging and fun. During the exercises, the trainer will offer individual help and suggestions. Afterwards, the solutions will be discussed and provided as source code.

Extended projects: There will be time in the afternoon on day 4 for longer projects. This is an extended chance to put what you have learned into practice, with the trainer's help.

Personal help: If you have particular goals or requests, please send us these before the course or have them ready to discuss.

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Topic outline

Day 1: Intermediate language features

Day 1 will teach you powerful Python language features and help you fill the gaps in your knowledge as a foundation for developing larger real-world systems:

- Files, bytes, and encodings

- Defining custom data types with classes; properties; inheritance; OOP

- Iterators and generators, with applications

- Decorators, closures, args in depth, with applications

- Idioms and elegant features of Python; newer Py 3.x features

- Elegant code beyond PEP8: special methods, context managers

- Raising and handling exceptions

- Creating modules and reusable packages; structuring projects

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Topic outline

Day 2: Best practices

Day 2 teaches you some "best practices" for developing maintainable, robust systems in teams:

- Python style and docstring conventions; linting: *pylint*, *Black*

- Automated unit-testing with *pytest* and *hypothesis*

- Packaging and deployment options and practices; environments

- Intro to Git and best practices: branching strategies; tagging; semantic versioning

- Continuous integration pipelines; *tox*; TDD

- Tips and tricks for writing elegant Python; functional idioms with *toolz*

- Integrated development environments; debugging tools; debugging inside *Docker* containers

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Topic outline

Day 3: APIs, websites, databases

Day 3 teaches you how to create database-backed websites and RESTful web APIs using *Flask*, an elegant, thriving Python web framework used by companies like Pinterest and Twilio to power billions of requests per month:

- Consuming web APIs in-depth with *requests* (sessions, OAuth)

- Background to creating dynamic websites and APIs with *Flask*:
  - Handling GET and POST requests and parameters;
  - HTTP responses and status codes; MIME types
  - Templating with *Jinja2*
  - Sessions; debugging

- Using SQL databases with *SQLAlchemy*

- Introduction to CRUD apps and creating RESTful APIs

- Navigating and documenting APIs with *OpenAPI* (*Swagger*)

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Topic outline

Day 4: Real-world example: web dashboards

Day 4 illustrates the concepts from days 1-3 with real-world examples: developing and deploying interactive web-based dashboards using *Dash* (which builds upon *Flask*). You will apply best practices to building, deploying, and maintaining a working Python application:

- Deploying and scaling Python apps

- Introduction to *Dash* layouts: HTML, Markdown, core components

- Input components and callbacks

- Forms and buttons: stateful callbacks

- Interactive visualizations with *Plotly*

- Multi-page apps; integrating *Dash* with *Flask* apps; debugging

- Worked examples: building and deploying *Flask* apps in teams

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Personal help

We are happy to offer on-the-spot problem-solving after each day of the training for you to ask one-on-one questions — whether about the course content and exercises or about specific problems you face in your work and how to solve them. If you would like us to prepare for this in advance, you are

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Other information

Format: Courses are conducted online via video meeting using Python Charmers' cloud notebook server for sharing code with the trainer(s).

Computer:
- **Hardware**: we recommend ≥ 8 GB of RAM and a webcam. Preferably also multiple screens and a quiet room (or headset mic).
- **Software**: a modern browser: Chrome, Firefox, or Safari (not IE or Edge); and Zoom.
- **Coding**: we have a cloud-based coding server that supports running code and sharing code with the trainer(s).

Timing: Most courses will run from 9:00 to roughly 17:00 (AEDT) each day, with breaks of 50 minutes for lunch and 20 minutes each for morning and afternoon tea.

Certificate of completion: We will provide you a certificate if you complete the course and successfully answer the majority of the exercise questions.

Materials: You will have access to all the course materials via the cloud server.

We will also send you a bound copy of the course notes, cheat sheets, and a USB

Instructor bio

Dr Edward Schofield

Ed has consulted to or trained over 2000 people from dozens of organisations in data analytics using Python, including A*STAR, Atlassian, Barclays, Cisco, CSIRO, Dolby, Harvard University, IMC, Singtel Optus, Oracle, Shell, Telstra, Toyota, Verizon, and Westpac. He is well-known in the Python community as a former release manager of *SciPy* and the author of the widely used *future* package. He regularly presents at conferences in data science and Python in Australia and internationally.

Ed holds a PhD in machine learning from Imperial College London. He also holds BA and MA (Hons) degrees in mathematics and computer science from Trinity College, University of Cambridge. He has 20+ years of experience in programming, teaching, and public speaking.

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Instructor bio

Henry Walshaw

Henry has almost 15 years of experience in Python application development and has trained hundreds of people in how to use Python from organizations including AGL, the Australian Bureau of Meteorology, ESRI, the NSW Department of Finance, National Australia Bank, and Telstra.

Henry's core technical expertise relates to the development and analysis of large scale spatial datasets (primarily using Python), and communicating this understanding to both subject matter experts and the general public.

Before joining Python Charmers, Henry worked in both government and industry — at Geoscience Australia, the Victorian Department of Sustainability and Environment, and the Environmental Protection Agency (EPA); as a consultant with Sinclair Knight Merz (SKM), a manager at we-do-IT, and as CTO of a startup. He holds a Bachelors in Computational Science.

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Instructor bio

Dr Robert Layton

Robert is the author of the book "Data Mining in Python", published by O'Reilly. He provides analysis, consultancy, research and development work to businesses, primarily using Python. Robert has worked with government, financial and security sectors, in both a consultancy and academic role. He is also a Research Fellow at the Internet Commerce Security Laboratory, investigating cybercrime analytics and data-mining algorithms for attribution and profiling.

Robert is a contributor to the Python-based *scikit-learn* open source project for machine learning and writes regularly on data mining for a number of outlets. He is also the author of the website "LearningTensorflow.com". He has presented regularly at a number of international conferences in Python, data analysis, and its applications.

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About Python Charmers®

Python Charmers is the leading provider of Python training in the Asia-Pacific region, based in Australia and Singapore. Since 2010, Python Charmers has given over 450 training courses and bootcamps to over 4,500 delighted people from organizations such as AGL, Atlassian, Barclays, CSIRO, Cisco, Deloitte, Dolby, IMC, pwc, Singtel Optus, Shell, Sportsbet, Telstra, Toyota, Verizon, Westpac, and Woolworths. Python Charmers specializes in teaching programming and data science to scientists, engineers, data analysts, quants, and computer scientists in the Python language.

Python Charmers' trainers boast years of Python experience and deep roots in the open source community, as both speakers at events and contributors to well-known open source projects, including *NumPy*, *SciPy*, *Scikit-Learn*, *Pandas*, and *Python-Future*.

Testimonials: Testimonials from past participants of similar training courses and bootcamps are available at

https://pythoncharmers.com/testimonials/

Questions: We are happy to customise this program further on request. Please let us know if you would like to discuss this or have any other questions.

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