



DEEP LEARNING WITH PYTORCH

COURSE GUIDE (V2): 2025
© 2025 PYTHON CHARMERS

Deep Learning with PyTorch

A specialist course

Audience: This is a course for data scientists, data analysts, engineers, researchers, software developers and quants.

Prerequisites: Prior experience with Python. High-school math knowledge is recommended. A quantitative background and familiarity with basic probability and linear algebra would also be beneficial but are not required.

You may skip day 1 if you have recently completed either of Python Charmers' courses *Python for Predictive Data Analytics* or *Python for Scientists and Engineers*.

Overview: This course introduces machine learning and deep learning using the Python packages *scikit-learn* and *PyTorch*

By the end of the course, you will understand the concepts of classical ML algorithms as well as neural networks, convolutional neural networks, and transformers, and you will have experience applying these in practice to develop and refine models for classification and regression across various domains.

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: 3 days

Price:

Regular course (3 days): AUD \$2,700 (excl GST)

Partial course (any 2 days): AUD \$1,800 (excl GST)

Dates:

<https://pythoncharmners.com/upcoming-courses/>

PYTHON
CHARMERS

Topic outline

Day 1: Machine learning

Day 1 gives you a practical and comprehensive introduction to machine learning for powerfully inferring complex models from data, with examples from a range of industries, including time-series and spatial datasets:

- Crash course in *NumPy*
- Concepts in machine learning (ML)
- Overview of the ML package ecosystem in Python
- Regression and classification with *scikit-learn*, with applications: time-series, diagnosis, image recognition, satellite, imagery, ...
- Validation and model selection; diagnostic tools; *yellowbrick*
- Feature engineering and selection; *eli5*, text analysis
- Outlier and anomaly detection with *pyOD*

Topic outline

Day 2: Deep learning

Day 2 introduces the approach to machine learning known as “deep learning”, using neural networks trained with the PyTorch library on GPUs:

- *PyTorch* nuts and bolts; using GPUs
- Concepts in deep learning (DL): network architectures, activation functions, loss functions, SGD
- Similarities and differences of *PyTorch* vs *scikit-learn*; the *skorch* API
- Residual and convolutional networks for time-series and image data
- Regularization: weight decay, dropout, pooling, batch normalization

Topic outline

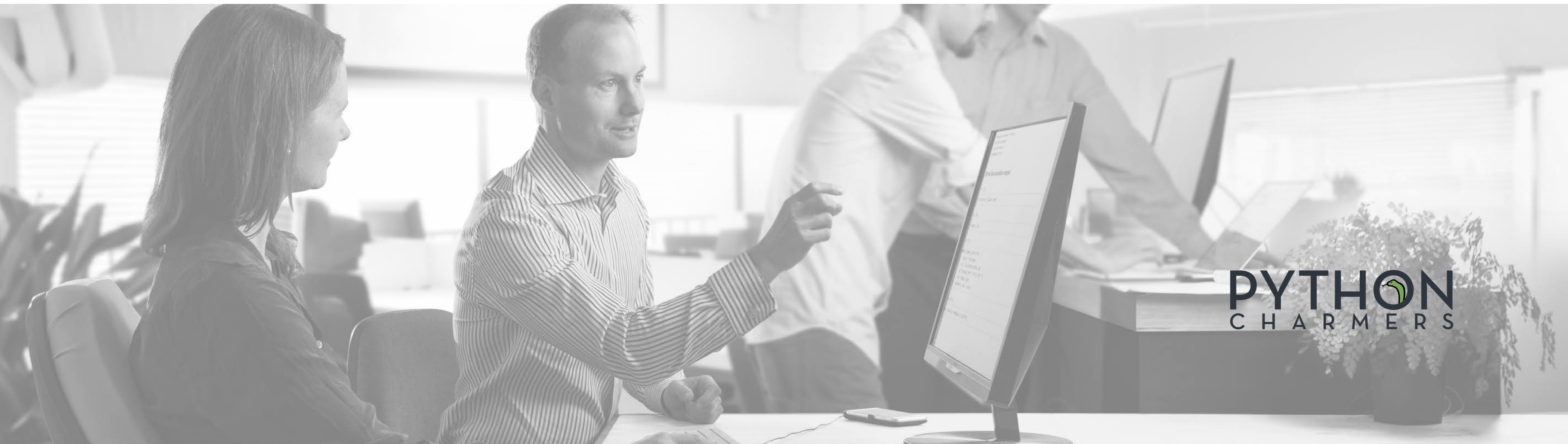
Day 3: Current and future directions; best practices

Day 3 describes some of the most promising recent architectural innovations in deep learning models. It then walks you through the theory and practice of refining existing models trained by others and gives you advice on how to refine and deploy models in production:

- Time-series modelling with recurrent networks; LSTM; transformers
- Fine-tuning pre-trained *PyTorch* models with HuggingFace
- Real-world advice on improving ML models; diagnostics
- Deploying machine learning models in production
- Overview of the DL package ecosystem in Python; trends, innovations: *Lightning; AutoPyTorch; Jax; Elegy*

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 welcome to send us background info before the course.



PYTHON
CHARMERS

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 (AEST/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 stick containing the materials, exercise solutions, and further resources.

```
data, cmap='winter' )
```

```
python3.7/site-packages/matpl
```

```
cnis+ elementwi comparison
```

```
but the future will perfo
```

```
str('ce')
```



PYTHON
CHARMERS

Instructor bio



Dr Edward Schofield

Ed has consulted to or trained over 3000 people from dozens of organisations in data analytics using Python, including 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.



Instructor bio



Dr Robert Layton

Robert is the author of the book “Data Mining in Python”, published by Packt. 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 was the author of the website “LearningTensorflow.com”, sold to DataBricks. He has presented at a number of international conferences in Python, data analysis, and its applications.





About Python Charmers®

Python Charmers is a leading global provider of training in data science and software development, based in Australia and Singapore. Since 2010, Python Charmers has given over 600 training courses and bootcamps to over 6,000 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.

Python Charmers' trainers boast years of experience with data science, data analytics, statistical modelling, and programming, and deep roots in the open source community, as both speakers at events and contributors to well-known open source projects for data science, including *NumPy*, *SciPy*, *Scikit-Learn*, *Pandas*, *Matplotlib*, *Scikit-Image*, *NetworkX*, and *Python-Future*.

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

<https://pythoncharmners.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.

Contact:

Phone: +61 1300 963 160

Email: info@pythoncharmners.com

Web: pythoncharmners.com



PYTHON
CHARMERS®

The image features a close-up, shallow depth-of-field shot of a person's hands typing on a laptop keyboard. The keyboard keys are dark with light-colored characters, and the person's skin is in soft focus. The Python Charmers logo is centered in the lower half of the frame. The word 'PYTHON' is in a large, white, sans-serif font, with a small green Python logo integrated into the letter 'O'. Below it, the word 'CHARMERS' is in a smaller, white, sans-serif font, followed by a registered trademark symbol (®).