



THE UNIVERSITY OF
SYDNEY

Applied Generative AI Programming Course with Python and Anthropic Claude

*Centre for
Continuing Education*

Applied Generative AI Programming Course with Python and Anthropic Claude



Explore the world of Generative AI programming with this comprehensive course designed to provide you with the knowledge and skills to excel in AI technology. Begin with an overview of Generative AI, including its wide-ranging applications and ethical considerations. You'll gain hands-on experience with essential tools including Python, setting the foundation for your AI projects.

Move on to advanced topics, such as Anthropic's Claude models, where you'll learn to create chatbots, optimise prompts, and fine-tune model outputs. Explore the power of embedding models through Voyage AI, mastering document processing, semantic search, and Retrieval-Augmented Generation (RAG).

Conclude with key resources from Hugging Face, LangChain and Llama Index, understanding their unique use cases and how to integrate them into your projects.

This course ensures a balanced blend of concept and practical application, preparing you to create innovative AI solutions with confidence and ethical responsibility.

Intended audience

This course is ideal for data scientists, machine learning engineers, and software developers who want to enhance their programmatic GenAI skills.



Course duration

1 session, 8 hours total



Time

9am - 5pm



Format

Face-to-face
or
Online in real-time



Dates

Browse available
[course dates](#)

Prerequisites

This course requires a thorough understanding of the Python programming language and is not suitable for beginner programmers. It's assumed you have completed the Python Programming 1B course or have equivalent knowledge in Python and Pandas programming.



Upon completion

Every participant receives a University of Sydney certificate of completion.



Aims

The aim of this course is to provide participants with the knowledge and skills required for Generative AI programming, from foundational tools to advanced techniques, enabling them to code innovative, responsible AI solutions.



Outcomes

By the end of this course, you should be able to:

- explain the fundamentals of Generative AI
- set up a development environment
- develop chatbots with Claude models
- master prompt engineering techniques
- fine-tune model temperature settings
- conduct semantic search
- implement and optimise embedding models
- use tokenisation
- apply Retrieval-Augmented Generation (RAG)
- leverage AI resources from Hugging Face, LangChain, and Llama Index
- consider ethical and responsible AI use and trustworthiness of results.



Content

1. Introduction to Generative AI

- Overview of Generative AI
- Applications and use cases
- Ethical and responsible AI use
- AI trustworthiness

2. Setting up the environment

- Introduction to Visual Studio Code
- Installing Python and necessary libraries
- Setting up a virtual environment

3. Large Language Model – Anthropic Claude

- Claude Models
- Creating your first Chat Bot
- The Message object
- Prompt engineering
- Temperature adjustments

4. Embedding models – Voyage AI

- Document processing
- Introduction to semantic search
- Overview of tokenisation, embedding models, and vector stores
- Implementing and optimising semantic search with Voyage AI
- Introduction to Retrieval Augmented Generation (RAG)
- Python implementation of RAG

5. Hugging Face, LangChain and Llama Index

- Overview
- Use cases and differences



Before the course – software requirements

Please download and install the following software prior to class:

- Visual Studio Code (or your preferred Python IDE like PyCharm or Spyder)
- Git for Windows (for Git Bash)

A Python extension is available through VS Code interface. No separate Python download is required, and other Python packages will be downloaded and installed in class.

This course will require API License Keys for Anthropic's Claude models and Voyage AI's embedding models. Claude API Keys require an initial \$25 USD worth of credits (the course will only use a few dollars of this). The free version of the VoyageAI API Key will suffice for the course requirements.



Delivery style

Interactive workshop including lectures, group exercises and discussion.

Materials

Course materials, including a presentation and a course booklet, are provided electronically.



Recommended reading

Chollet, F. (2018) *Deep Learning with Python*. 1st ed. Shelter Island, NY: Manning Publications.

Foster, D. (2019) *Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play*. 1st ed. Sebastopol, CA: O'Reilly Media.

Mitchell, M. (2019) *Artificial Intelligence: A Guide for Thinking Humans*. 1st ed. London: Penguin Random House.



Organisational training and development

This course can be delivered as a private session for groups, and tailored to meet the needs of your business. Contact us to discuss our range of organisational training solutions.

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We recognise and pay respect to the Elders and communities – past, present, and emerging – of the lands that the University of Sydney's campuses stand on. For thousands of years they have shared and exchanged knowledges across innumerable generations for the benefit of all.

Empower ambition,
inspire leadership

For more information

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