Econ621: Programming in Python 2023-2024

COURSE AIMS & OBJECTIVES, KEY SKILLS AND LEARNING OUTCOMES

Course Aims & Objectives: This course introduces programming in Python. It covers the basics of programming skills, including data types, variables, loops and functions. Further, the course covers common Python libraries and frameworks for data manipulation, visualisation, and machine learning.

Key Skills: By the end of this course, students should have some knowledge and understanding of:

- Python Proficiency: Mastery of Python programming for data science.
- Data Science Basics: Fundamental concepts and skills for data science in Python.
- Library Competence: Efficient use of key Python libraries for data science.
- Practical Application: Applying Python to real-world data science tasks.
- Versatile Python Use: Adapting Python for diverse data science applications.
- Effective Coding Practices: Writing efficient and effective Python code

Desired Outcomes: By the end of this course, students should be able to:
- Present, interpret and analyse information in numerical form and use econometric and other packages effectively;
- Master the programming tools and important libraries for data science.

COURSE STRUCTURE

Econ 621 is a 10 credits course and therefore students are expected to input approximately 100 hours of study into the course. The total number of contact hours on Econ 621 is 15 hours. This leaves 85 hours for private study. Course Delivery comes in the form of Lectures with 15 hours delivered over the first 3 weeks of the term (10 hours of lectures and 5 hours of tutorials). There will be optional clinics on the last day of the course.

During your private study you should strike a balance between reading the course material (which is the primary source of information) and the recommended textbooks, thinking critically about how these fit in to the body of knowledge on the subject and about how our level of knowledge can be improved, performing exercises, completing coursework and revising for examinations. You can expect to perform well on this course only if you work consistently through the year.

COURSE CONVENOR

Professor Régis Amichia

Email: regis@foxintelligence.io

LECTURERS CONTACT INFORMATION (Including Office Hours)

Régis Amichia

Email: regis@foxintelligence.io

Thomas Pical

Email: tpical@equancy.com

COURSEWORK ASSESSMENT

The CWA mark will be calculated as 100% coursework. The coursework will be assigned at the end of the course

The coursework will be delivered to students at the end of week 6 of each term (31st May) and is due for submission at the end of week 10 of the term (28th June), allowing students 4 weeks for completion.

Coursework must be submitted electronically through the Moodle site for this course:

FEEDBACK ON COURSEWORK:

The coursework will be marked and returned to students within 4 weeks of the submission deadline. Feedback will consist of marker's notes appended to the pdf of your coursework.

MARKING CRITERIA AND PENALTIES

Marking criteria can be found in the Economics Undergraduate Handbook and the general course information paper. An electronic copy of this can be found via the Current Student page of the university website then follow the Academic Regulations link
https://gap.lancs.ac.uk/ASQ/QAE/MARP/Documents/UG-Assess-Regs.pdf

FINAL MARK INFORMATION

This course is assessed 100% by means of coursework. The final mark is the average of the marks obtained in the two pieces of coursework.

COURSE TEXT AND RECOMMENDED READING

Lecture notes and Lecture slides.

Python Data Science Handbook: Essential Tools for Working with Data - Oreilly.

Deep Learning with Python - Francois Chollet, Simon and Schuster.

MARKING CRITERIA AND PENALTIES

Marking criteria can be found in the Economics Undergraduate Handbook and the general course information paper. An electronic copy of this can be found via the Current Student page of the university website then follow the Academic Regulations link
https://gap.lancs.ac.uk/ASQ/QAE/MARP/Documents/UG-Assess-Regs.pdf

COURSE OUTLINE/LECTURE SCHEDULE

Introduction to Programming and Python

- Python versus other programming languages;
- Introduction to the Python programming language.

Data Types and Variables

- Data types in Python: numbers, strings, lists, and dictionaries;
- Defining and using variables in Python;
- Basic operations and manipulations on data types.

Control Structures and Loops

- Conditional statements;
- Control structures;
- For and while loops.

Functions and Modules in Python

- Defining and using functions in Python;
- The importance of modularity and code organisation;
- Importing and using modules and libraries.

Data Manipulation and Visualization

- Data manipulation and visualisation using Python;
- The Pandas and Matplotlib libraries;

Examples of data manipulation and visualisation.

Introduction to Machine Learning with Python

- Introduction to the scikit-learn library for machine learning in Python;
- Simple examples of data science with Python

Lecture 1 : Introduction to Python

- Introduction to Python

- Python Installation

- Introduction to Shell / Google Collab

- Instructions and indenting

Lecture 2: Data Structures

- Data types in Python: numbers, strings, lists, sets, tuples and dictionaries;
- Defining and using variables in Python;
- Basic operations and manipulations on data types.

- Introduction to DataFrames

Lecture 3 : Control Structures and Loop

- Conditional statements;
- Control structures;
- For and while loops.

- Imbricated loops

Lecture 4 : Functions and modular programming

- Defining and using functions and classes in Python;
- The importance of modularity and code organisation;
- Importing and using modules and libraries.

Lecture 5 : Introduction to Data Visualization and Machine Learning

- Introduction to the scikit-learn library for machine learning in Python;
- Pandas and Matplotlib
- Simple examples of data science with Python