Hertie School

Master of International Affairs/Master of Public Policy

Fall Semester 2022

Course Syllabus

GRAD-E1326: Introduction to Python Programming
Area of Concentration: *Policy Analysis*

1. General information

Course Format	Onsite
Instructor(s)	Hannah Bechara
Instructor's e-mail	bechara@hertie-school.org
Assistant	Email: adjunctsupport@hertie-school.org
Instructor's Office Hours	Mondays 10-12

Link to Study, Examination and Admission Rules and MIA, MDS and MPP Module Handbooks

For information on **course times, session dates and course locations** please consult the Course List on *MyStudies*.

Instructor Information:

Hannah is an NLP post-doc who inadvertently found herself hired by Hertie's Data Science lab. In between training neural networks and support vector machines, Hannah occasionally teaches programming classes in Python, the programming language for winnners. For reasons yet unclear, the University of Wolverhampton decided to award Hannah a PhD in Computer Science.

2. Course Contents and Learning Objectives

Course contents:
This course is an introductory course to Python Programming for Data Science. It takes students through the basic aspects of programming with Python and introduces some useful libraries and packages for data manipulation and analysis.

Main learning objectives:
Master the fundamentals of writing Python scripts
Learn core scripting elements such as variables and flow control structures
Discover how to work with lists and sequence data
Write Python functions to facilitate code reuse
Use Python to read and write files
Learn how to use Pandas, NLTK, and other useful libraries.
Learn how to collaborate and contribute to a coding project

Target group:
This course is designed for beginners with no previous programming experience who are interested in learning Python for Data Science. It is especially recommended for students who would like to learn how to use programming for data analysis. It is not meant to be a prerequisite for machine learning or data structures.

Teaching style:
Classes will be highly interactive, focusing on hands-on experience and allowing students to test out everything they have learned in class. Each 2-hour will include a lecture that introduces some core concepts, a classroom activity that allows students to try out what they learned and solve a problem, and a discussion of the solutions to the problem.

Prerequisites:
None. This course is intended for students with no previous programming experience.

Diversity Statement:
Understanding and respect for all cultures and ethnicities is central to the teaching at Hertie. Being mindful of diversity is an important issue for policy professionals in the planning, implementation, and evaluation of programmes designed for specific groups, populations, or communities. Diversity and cultural awareness will be integrated in the course content whenever possible.

3. Grading and Assignments

The assessment for the course consists of a project, presentation and participation. The research project must be done in teams of 2-4 (individual submissions will not be accepted for the project). The aim of the assessments is three-fold. First, it will provide you with the opportunity to apply the concepts learned in this class creatively, which helps you with understanding material more deeply. Second, designing and working on a unique project in a team which is something that you will encounter, if you haven't already, in the workplace, and the project helps you prepare for that. Third, along with the opportunity to practice and the satisfaction of working creatively, students can use this project to enhance their portfolio or resume.

Note about grading. You will be graded on the quality of your code as well as the efficiency and tidiness. Additionally, you are expected to document your code and to clearly mark any code that is not your own. Smelly code will be penalised.

You must include a link to a GitHub repository containing the code of your project. Your repository must be viewable to the instructor by the submission deadline. If your repository is private, make it accessible to us (GitHub ID hbechara). If your repository is not visible to us, your assignment will not be considered complete, so if you are worried please submit well in advance of the deadline so we can confirm the repository is visible. Furthermore, we will assess individual contribution to the team, should such an issue arise, based on the frequency and quality of GitHub commits in your project repository, so make sure you start the repository as the very first stage of your project.

Composition of Final Grade:

Assignment 1: Group Presentations	Deadline: Week 7	Submit via classroom presentation	25%
Assignment 2: Project Proposals	Deadline: 24.10.2022	Submit via Moodle,	25%
Assignment 3: Final Projects	Deadline: Week 12	Submit via Moodle,	40%
Final Projects Presentations	Deadline: Week 12	Submit Via Classroom presentation	10%

Commented [RT1]: Please provide when in week 12 the final project would be due.

Assignment Details

Assignment 1
Starting Week 4, each team of 2-4 students will give a 20-minute presentation on a package, library or framework of their choice. A list of options will be provided at the start of the semester.

Assignment 2
Each team should submit a project proposal by week 7 (24.10.2022). The proposal should include a brief description of the project, the project's goals, a list of the packages and libraries that will be used, and a list of participating members. The project proposal should not exceed 2 pages.
The main purpose of the project proposal is to receive feedback from the instructor regarding whether your project is feasible and whether it is within the scope of this class. Also, the project proposal offers a chance to receive useful feedback and suggestions on your project.

Commented [RT2]: Please provide more information about the assignment, if possible.

Assignment 3
You must include a link to a GitHub repository containing full working code of your project.

Final Presentations
Each team will present a 10-minute demo of their final project.

Late submission of assignments: For each day the assignment is turned in late, the grade will be reduced by 10% (e.g. submission two days after the deadline would result in 20% grade deduction).

Attendance: Students are expected to be present and prepared for every class session. Active participation during lectures and seminar discussions is essential. If unavoidable circumstances arise which prevent attendance or preparation, the instructor should be advised by email with as much advance notice as possible. Please note that students cannot miss more than two out of 12 course sessions. For further information please consult the Examination Rules §10.

Academic Integrity: The Hertie School is committed to the standards of good academic and ethical conduct. Any violation of these standards shall be subject to disciplinary action. Plagiarism, deceitful actions as well as free-riding in group work are not tolerated. See Examination Rules §16 and the Hertie Plagiarism Policy.

Compensation for Disadvantages: If a student furnishes evidence that he or she is not able to take an examination as required in whole or in part due to disability or permanent illness, the Examination Committee may upon written request approve learning accommodation(s). In this respect, the submission of adequate certificates may be required. See Examination Rules §14.

Extenuating circumstances: An extension can be granted due to extenuating circumstances (i.e., for reasons like illness, personal loss or hardship, or caring duties). In such cases, please contact the course instructors and the Examination Office *in advance* of the deadline.

4. General Readings

Michael Dawson: Python for Absolute Beginners

Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny,

Python Documentation: https://docs.python.org/3/

Python Cheat Sheets: https://ehmatthes.github.io/pcc/cheatsheets/README.html

https://greenteapress.com/wp/think-python-2e/

https://en.wikibooks.org/wiki/Non-Programmer%27s_Tutorial_for_Python_3

https://www.youtube.com/playlist?list=PLlrxDoHtieHhS8VzuMCfQD4uJ9yne1mE6

5. Session Overview

Course session times and dates can be found in the Course List on *MyStudies*.

Session	Session Title
1	**Getting started with Python: Jupyter Notebooks and Github**
2	**Flow Control**
3	**Data Structures**
4	**Functions**
5	**Working with Files**
6	**Packages and Libraries**
7	**Modules and Documentation**
8	**Data Frames and Analysis (Pandas)**
9	**Data Visualisation (Matplotlib)**
10	**Numerical and Scientific Programming (NumPy/SciPy)**
11	**Natural Language Processing (NLTK/SpaCy)**
12	**Final Project Presentations**
Final Exam Week: no class	

Midterm Exam Week: 24—28 Oct 2022 – no class

6. Course Sessions and Readings

Please refer to Moodle to access the course readings. For sessions marked "none", there are no required readings.

Commented [RT3]: Please confirm that for sessions with "none" in the required readings section, there would be no readings indeed. In case there are required readings for these sessions, please add them.

Session 1: Getting started with Python: Jupyter Notebooks and Github	
Required Readings	Chapter 1 &2: Python Programming for the Absolute Beginner by Michael Dawson
Optional Readings	https://realpython.com/python-introduction/ https://www.programiz.com/python-programming/variables-datatypes https://www.w3resource.com/python/python-variable.php

Session 2: Flow Control	
Required Readings	Chapter 3: Python Programming for the Absolute Beginner by Michael Dawson
Optional Readings	http://www.python-course.eu/python3_conditional_statements.php http://www.python-course.eu/python3_loops.php http://www.python-course.eu/python3_for_loop.php

Session 3: Data Structures	
Required Readings	Chapter 4: Python Programming for the Absolute Beginner by Michael Dawson
Optional Readings	https://realpython.com/lessons/lists-tuples-python-overview/ https://realpython.com/python-dicts/

Session 4: Functions	
Required Readings	Chapter 6: Python Programming for the Absolute Beginner by Michael Dawson
Optional Readings	https://en.wikibooks.org/wiki/Non-Programmer%27s_Tutorial_for_Python_3/Defining_Functions

Session 5: Working with Files	
Required Readings	None

Optional Readings	https://realpython.com/working-with-files-in-python/

Session 6: Packages and Libraries	
Required Readings	None
Optional Readings	https://www.youtube.com/playlist?list=PL9uhVLVot-TVC9juwVo_Y24joV4gsbGI8

Session 7: Modules and Documentation	
Required Readings	None
Optional Readings	None

Session 8: Data Frames and Analysis (Pandas)	
Required Readings	Chapter 6 of Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny
Optional Readings	https://pandas.pydata.org/docs/

Session 9: Data Visualisation	
Required Readings	Chapter 9 of Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny
Optional Readings	https://www.geeksforgeeks.org/data-visualization-with-python/

Session 10: Numerical and Scientific Programming	
Required Readings	Chapter 4 of Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny
Optional Readings	https://numpy.org/doc/

Session 11: Natural Language Programming	
Required Readings	None
Optional Readings	https://www.nltk.org/

Session 12: Final Presentations	
Required Readings	None

Optional Readings	None

Final Exam Week: no class