Programming

University: TU/e

Level: BA all years

Teaching mode: hybrid: EuroTeQ students attend online, home students attend on campus

Instructor(s): Mark van den Brand, David Manrique, Lina Ochoa, Mauricio Verano, Mazyar Seraj

Description

This course introduces imperative and object-oriented programming using Python. It also applies the learned programming concepts to novice data science problems. Some of the topics of the course are: basic imperative programming (assignment, choice, repetition, input/output, functions), typing, recursion, objects (both data objects, or records, and domain objects), a few collection classes, inheritance, interfaces, specification of methods, coding style practice, regular expressions, and basic handling of large data sets.

Learning outcomes

After this course;

• Students know the principles of imperative programming and can show this by writing elementary imperative programs from scratch on the basis of an informal specification.

• Students know some general algorithmic techniques (aggregation, searching, sorting) and can apply these in writing programs and designing simple algorithms.

• Students know the main aims and principles of object-oriented programming and can show this by making, with aid, simple object-oriented designs and implementing these; they can use is-a relationship, has-a relationship, abstract classes, interfaces, polymorphism.

• Students know how to write unit tests in Python.

• Students know how to map and filter in Python.

• Students know how to develop Python programs using Jupyter Notebooks.

• Students know how to develop Python programs using and IDE such as PyCharm.

• Students know some principles of code quality and can apply these to their own program. They are able to write programs that adhere to a common style quality standard.

- Students are introduced to the software engineering aims of maintainability, flexibility, and reusability. They understand how object-oriented constructs can contribute to these aims and can apply these principles in a limited fashion on their own code.

- Students know how to read a large data set and clean it in Python for analysis purposes.

- Students apply their knowledge of graphics, algorithms, algorithmic complexity, and code quality by writing programs that perform some analysis and visualization techniques on large data sets.

General information

Contact hours per week:	At least 6 hours
Total workload:	140
ECTS credits:	5
Language:	English

Course start date:	06/09/2021
Course end date:	14/11/2021
Weekly teaching day/time:	Monday (8:45 – 12:30); Thursday (13:30 – 17:15)
Time zone:	CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
Further information:	

Prerequisites:	Completed none of the following course: Programming (2IP90), Programming for PT (0HV120), Programming methods (2IPC0), Introduction to object programming (2IPG0), Fundamentals of algorithmic programming (1BK60), Software development for engineers (2IS50)
Activities and methods:	Lectures, Self-study, Exercises, Tutorial sessions, Instructions, Assignments
Presence on campus:	Whole quartile only for first year Data Science students

Final examination

Form:	written
Date:	
Location:	
Re-sit possibility:	yes
Transcript available:	

Add. info/requirements: The exam for this course is a Jupyter notebook (i.e. written exam with computer assistance)

Registration

To register for this course, follow the registration requirements of your **home university** as specified here: www.euroteq.eu/courses-registration.

Administration

Number of places: Max. 40

Internal course code: JBI010

Contact: m.g.j.v.d.brand@tue.nl, l.m.ochoa.venegas@tue.nl

_____

This course is part of the EuroTeQ Engineering University joint course catalogue 2021/22. This is a collaborative activity of the eight partner universities DTU, L'X, TU/e, TalTech, CTU, TUM as well as EPFL and Technion. Students from these universities can participate in the offered courses. It is the responsibility of the student to check if you fulfil the requirements to participate in a specific course. Students are also advised to check with their home institution how to get recognition of the ECTS credits gained in courses of the EuroTeQ course catalogue. For further information about EuroTeQ Engineering University, visit www.euroteq.eu or get in touch with the above-mentioned point of contact.