

Programming

Subject area: Computer Science/ICT

University:	TU/e
Level:	BA all years
Teaching mode:	hybrid: some students participate online, other students attend real-life
Instructor(s):	Mark van den Brand, David Manrique, Lina Ochoa, Mazyar Seraj

Short description

This course introduces imperative and object-oriented programming using Python. Fundamental programming topics are covered during the course. In addition, it applies the learned programming concepts to novice data science problems, such as handling and extracting data from large datasets.

Full 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: 8 hours: 4 hours of lectures and 4 hours of instructions

Total workload: 140 (in student hours for the whole course)

ECTS credits: 5

Language: English

Course start date: 05 September 2022

Course end date: 29 October 2022

Add. info about start date:

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: None, it is a first year Bachelor's course

Activities and methods: Lectures, Self-study, Exercises, Tutorial sessions, Instructions, Assignments

Presence on campus:

Final examination

Form: written

Date: 31 October 2022

Location/format: online

Re-sit possibility: yes

Transcript available: end of semester

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

Minimum participants:

Internal course code: JBI010

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

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