

## Computer Science (E701053)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 6.0**

**Study time 180 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 2)

Dutch

Gent

seminar

lecture

**Lecturers in academic year 2023-2024**

Brouns, Leen

TW05

staff member

Denert, Marleen

TW05

staff member

Naessens, Helga

TW05

lecturer-in-charge

**Offered in the following programmes in 2023-2024**

[Bachelor of Science in Engineering Technology\(main subject Chemical Engineering Technology\)](#)

**crdts**

6

**offering**

A

[Bachelor of Science in Engineering Technology\(main subject Civil Engineering Technology\)](#)

6

A

[Bachelor of Science in Engineering Technology\(main subject Electromechanical Engineering Technology\)](#)

6

A

[Bachelor of Science in Engineering Technology\(main subject Electronics and ICT Engineering Technology\)](#)

6

A

[Bachelor of Science in Engineering Technology\(main subject Information Engineering Technology\)](#)

6

A

[Bachelor of Science in Engineering Technology \(Joint Section\)](#)

6

A

[Master of Science in Teaching in Social Sciences\(main subject Communication Science\)](#)

6

A

[Master of Science in Communication Science\(main subject New Media and Society\)](#)

6

A

**Teaching languages**

Dutch

**Keywords**

Programming, Python, HTML, CSS, databases, SQL, computer science (P170), informatics (P175), computer technology (T120)

**Position of the course**

The purpose of this course is:

- to give insight into the role and operation of computers and networks;
- to learn to program, learn to think logically, learn splitting tasks into subtasks;

On the one hand, this course has a practical purpose:

- it learns to exploit the potential of computers, networks and applications more optimal
- it teaches the students to make their own programs for instance for calculations, processing data or simulations;
- it learns the students to make a simple website with the use of HTML and CSS;
- it learns the students to retrieve, add, modify and remove information from a simple database.

On the other hand, this course has a broad educational value: it gives insight into abstract structures and processes, it develops analytical skills, the students learn to think modularly, they learn to solve problems themselves and to formulate appropriate solutions. The acquired theoretical knowledge and skills are used in many other areas (design, planning, optimization, ...).

**Contents**

This course consists of several blocks.

Part 1 focuses on both hardware and software principles of computer operation:

- How does a computer work and how is it controlled?
- How are data stored, organized and structured? What are the most important file formats, eg for pictures, audio and video?
- How do computers communicate with each other? How does the Internet work?

In part 2 the students take the first steps to building algorithms. It teaches the students to program in Python. The following topics are covered: basics of structured programming (variables, sequence, selection, repetition) and of data structures and algorithms (functions, strings, lists, tuples, dictionaries, iteration, search, using files).

In addition, there is a short introduction to create web applications. What are the principles behind popular web applications? How are web pages and web forms made?

Finally, an introduction to databases is given, including the following topics: principles and concepts of relational databases (tables, columns, rows, relationships) and simple SQL (with emphasis on SELECT).

### **Initial competences**

Scientific basic competences acquired in secondary education.

### **Final competences**

- 1 Being able to gain insight in the architecture, functionality and the components of a computer and network system.
- 2 Being able to gain insight in the representation of some important data types both internally in the computer and externally.
- 3 Knowing and being able to apply the basic concepts of programming in Python.
- 4 Being able to analyze and to structure a problem and to translate it into a computer program.
- 5 Being able to make independently simple web pages.
- 6 Being able to query or modify a database via simple SQL commands.

### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

### **Teaching methods**

Seminar, Lecture

### **Extra information on the teaching methods**

During the lectures (30hrs) the theory is explained step by step, partly based on examples.

During the exercise sessions (30hrs) the student works on his laptop.

### **Learning materials and price**

Syllabus (Dutch) "Basiskennis Informatica, Webpagina's en Inleiding tot databanken", sold by student organisation (estimated cost: 5 euro)

Book "Practice of Computing Using Python, William F. Punch and Richard Enbody, Pearson."

Purchase without obligation (estimated cost: 70 euro)

Slides, program examples and exercises are provided on the electronic learning environment

Books are available at the library.

### **References**

Practice of Computing Using Python, William F. Punch and Richard Enbody, Pearson

Think Python, Allen B. Downey, O'Reilly

Learning Python, Mark Lutz, O'Reilly

An introduction to Computation and Programming using Python, John V. Guttag, MIT Press

### **Course content-related study coaching**

The student can always make an appointment with the teacher.

### **Assessment moments**

end-of-term and continuous assessment

### **Examination methods in case of periodic assessment during the first examination period**

Written assessment with open-ended questions

### **Examination methods in case of periodic assessment during the second examination period**

Written assessment with open-ended questions

### **Examination methods in case of permanent assessment**

Skills test, Participation, Assignment

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is not possible

### **Extra information on the examination methods**

- PE: written examination. The exam is a practical exam, consisting mainly of exercises, possibly complemented by a few theoretical questions.
- NPE: website, quotation of submitted exercises in Dodona, optional test Python

### **Calculation of the examination mark**

Written examination: 90%

Website and quotation of submitted exercises in Dodona for the labs: 10%

If the student participated to the (optional) Python test, he can decide for himself whether or not to use the obtained points for a particular question of the examination. If the student does not solve the exam question, the score obtained for (the question of) the test will be transferred for this question.

If the question is solved, the score of the (question of the) test is not used (the points for (that question of) the test are therefore not taken into account).

### **Facilities for Working Students**

Contact the responsible professor