

## System Programming (C003776)

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

**Credits 6.0**                      **Study time 180 h**                      **Contact hrs**                      60.0h

**Course offerings and teaching methods in academic year 2022-2023**

A (semester 1)	Dutch	Gent		
			lecture	30.0h
			project	5.0h
			seminar: practical PC room classes	20.0h
			group work	5.0h

**Lecturers in academic year 2022-2023**

De Turck, Filip	TW05	lecturer-in-charge
Volckaert, Bruno	TW05	co-lecturer

**Offered in the following programmes in 2022-2023**

	crdts	offering
<a href="#">Bachelor of Science in Computer Science</a>	6	A
<a href="#">Bachelor of Science in Mathematics</a>	6	A
<a href="#">Master of Science in Bioinformatics(main subject Systems Biology)</a>	6	A

**Teaching languages**

Dutch

**Keywords**

Procedural programming, C programming language, hybrid programming language, C++ , software design paradigms.

**Position of the course**

After prior introductory courses in programming, the objective of this course is to widen the knowledge and understanding of programming languages, as well as to treat the basic principles of paradigms for software design in a more generic way : procedural, object oriented and aspect oriented.

The major objective is to give an extended overview of current paradigms for software engineering. It fits in the bachelor curriculum since programming techniques are put in a broader context. Students are prepared for later courses which are more about development methodology and also for carrying out realistic development projects in the final phase of the bachelor curriculum.

**Contents**

- 1 Procedural programming (using C) and hybrid languages (using C++).  
This implies following skills:
  - using pointers
  - reference types versus value semantics
  - operator overloading
  - inheritance, both single and multiple
  - separation of interface and implementation, illustrating a weakness of C++
  - generic programming and data abstraction
  - the STL library
  - exception handling
- 2 Paradigms of software design
  - object oriented paradigm
    - a conceptual discussion of object orientation
    - the limitations of the paradigm
  - platforms for support of large software projects with multiple programmers

- Version Systems
  - Generation of Makefiles
  - overview of currently important software technologies
    - Application on portable devices (PDA,s Smart phones, etc)
- 3 A software design project (groups of 2 students) focusing on software development in the C and C++ programming languages.

#### Initial competences

- A good knowledge of at least one programming language, preferably an object oriented language (Java)
- Initial experience with the basic principles of object orientation
- Some knowledge of computer architecture
- Experience with using a computer
- These objective are met by the courses "Programming" and "Object Oriented Programming" which come earlier in the curriculum

#### Final competences

- 1 A good view on several paradigms for software design.
- 2 A good knowledge of several programming languages.
- 3 Insight in the available platforms for support of large projects.
- 4 An overview of currently important software technologies.

#### 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

Group work, Lecture, Project, Seminar: practical pc room classes

#### Learning materials and price

The presentations used in the plenary sessions can be downloaded from the e-learning environment Ufora.

Problems and training material for the lab sessions (via Ufora), with individual feedback.Extra materials via Ufora.

Recommended reference book: "A Book on C", Kelley en Pohl, 4e editie, Addison-Wesley

will be advised. Distribution of the book: to be organised by the students' association

Price of the course material : 10 Euro (estimation)

The material that can be downloaded from Ufora: for free

Reference book: 40 Euro

#### References

- A Book on C, vierde editie (Al Kelley, Ira Pohl), ISBN: 90.430-0497.9 (English version)
- De programmeertaal C++ (Bjarne Stroustrup), ISBN: 90.430-0231.3 (optional)

#### Course content-related study coaching

An e-learning environment (including discussion fora supporting the building of a community)

Lab sessions : assistants are available to help the students during these sessions and give feedback on the submitted solutions

Teacher and assistants can be reached by e-mail and online discussion fora

#### Assessment moments

end-of-term and continuous assessment

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

Skills test, Open book examination

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

Skills test, Open book examination

#### Examination methods in case of permanent assessment

Skills test, Assignment

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

examination during the second examination period is possible in modified form

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

- During examination period: written open-book exam.
- During semester: graded project code and project report.  
Frequency: one project in teams of two students.

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

Evaluation throughout semester (submitted code for the project and project report counts for 25 % of the total evaluation) as well as during examination period.

In case of a clearly different amount of contributions from the team members, the score of the students from the same team can be different.

In case a score of less than 9/20 is obtained for the examination, the student can not pass the course. If the total score would then be 10/20 or more, the total score will be reduced to 9/20.