Course Specifications

Valid as from the academic year 2020-2021

Programming in C and C++ (E761018)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

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

Credits	Study time	Contact hrs
6.0	180 h	60.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	Dutch	Gent	seminar: practical PC room classes	18.0 h
			online seminar: practical PC room classes	12.0 h
			online lecture	30.0 h

Lecturers in academic year 2020-2021

Naessens, Helga	TW05	lecturer-in-charge
Van Den Breen, Wim	TW05	co-lecturer

Offered in the following programmes in 2020-2021	crdts	offering
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
Linking Course Master of Science in Electronics and ICT Engineering Technology (main subject Electronics Engineering)	6	A
Linking Course Master of Science in Electronics and ICT Engineering Technology (main subject Embedded Systems)	6	A
Linking Course Master of Science in Electronics and ICT Engineering Technology (main subject ICT)	6	A
Linking Course Master of Science in Information Engineering Technology	6	A
Preparatory Course Master of Science in Electronics and ICT Engineering Technology (main subject Electronics Engineering)	6	A
Preparatory Course Master of Science in Electronics and ICT Engineering Technology (main subject Embedded Systems)	6	A
Preparatory Course Master of Science in Electronics and ICT Engineering Technology (main subject ICT)	6	A

Teaching languages

Dutch

Keywords

Informatics, Programming Language, Object oriented Programming, C++, C, Pointers, Computer Science (P170), Informatics (P175), Computer Technology (T120).

Position of the course

An in-depth course in C and C++ for those already familiar with some programming language, like for example Java.

Contents

The section Programming in C includes the following topics:

- Basic concepts: variables and basic data types, operators, control structures, input/output, functions, arrays
- Pointers: basic concepts, call by reference, pointers and arrays, pointer to const, operations on pointers, pointer as result of a function, constant pointer, function pointers, C-strings
- Structs

- Dynamic memory management
- Linked lists
- Bit fiddling

The section Programming in C++ includes the following topics:

- Basic concepts: basic data types, reference type, function templates, console input and output, namespaces, working with files, dynamic file management
- Collections: introduction, iterators, sequences, sequence adapters, associative containers
- Basic OOP in C++: classes in C++, class templates, constructor-destructor, copy constructor, separate compilation, objects as instance variables, friend functions and classes, operator overloading
- Inheritance in C++: public versus private inheritance, constructors/destructor in derived classes, overriding =-operator, keyword protected, polymorphism and dynamic binding, abstract classes, virtual destructor, multiple inheritance
- Exception handling
- Automatic type derivation, initialization syntax, move constructor and move operator, defaulted and deleted functions, functions as parameters and lambda functions, nullptr, smart pointers (unique_ptr and shared_ptr)

Initial competences

A good experience with some programming language (like for example Python): methods, sequence, selection, iteration, collections, ...
For the section programming in C ++, the student must have notions of object oriented programming. If the student has no experience with this at the start of this course, it is best to follow the course 'object oriented programming' at the same time.

Final competences

1 Independently implement, test and execute a computer program in C and C++.
2 Transform a (object oriented) design into a working computer program in C and C++.
3 Analyze and structure a problem and translate it into a computer program in C or C++.

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: practical PC room classes, online lecture, online seminar: practical PC room classes

Extra information on the teaching methods

During the lectures (30 h) the theory is explained step by step, partly based on examples.
During the exercise sessions (30 h) the student works independently on a PC.

Learning materials and price

Slides, examples and exercises with solutions are provided on the electronic learning environment.
Some books about the course topics are available in the library.
Book (English) "C++ Primer, 5th Edition, Lippman & Lajoie & Moo, Addison-Wesley".
Purchase without obligation. Estimated cost: max. 55 euro

References

- Head First C, David Griffiths & Dawn Griffiths, ISBN 978-1-4493-9991-7
- Beginning C, 5th Edition, Ivor Horton, ISBN 978-1-4302-4881-1
- C in a Nutshell, Peter Prinz & Tony Crawford, ISBN 978-0-596-00697-6
- The C Programming Language, second edition, Kernighan & Ritchie, ISBN 978-0-1311-0362-7
- Programming in C, 4/E, Stephen G. Kochan, ISBN 978-0-3217-7641-9
- The C Programming Language, B.W. Kernighan, D.M. Ritchie, ISBN 978-0-1311-0362-7
- C++ Primer, 5th Edition, S.B. Lippman, J. Lajoie, B. Moo, ISBN 978-0-3217-1411-4
- A Tour of C++, 2/E, Bjarne Stroustrup, ISBN 978-0-1349-9783-4
- Problem Solving with C++: Global Edition, 10/E, Walter Savitch & Kenrick Mock, ISBN 978-1-2922-2282-0

Course content-related study coaching

The student can always make an appointment with the teacher.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Skills test

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

PE: the exam is a practical exam, consisting mainly of exercises, possibly complemented by a few theoretical questions.
NPE: there's a skills test about programming in C. Participation in the test is not mandatory.

Calculation of the examination mark

Written examination: 100%
If the student participated to the test about programming in C, 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 (specific question of the) test will be transferred for this question.
If the question is solved, the score of the (specific question of the) test is not used (the points for (that question of) the test are therefore not taken into account).