Course
Specifications
From the academic year 2016-2017 up to and including the
Microcontrollers (E620015)

Course size
(nominal values; actual values may depend on programme)
Credits 6.0 Study time 180 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2019-2020
A (semester 2) Dutch practicum 36.0 h
lecture 24.0 h

Lecturers in academic year 2019-2020
wyffels, Francis TW06 lecturer-in-charge

Offered in the following programmes in 2019-2020
Bachelor of Science in Engineering Technology (main subject
Electronics and ICT Engineering Technology)

Teaching languages
Dutch

Keywords
microcontroller, embedded system

Position of the course
In the course microcontroller, both the internal structure of an 8-bit microcontroller as
the interfacing with the outside world are being studied.

Programming and configuring the microcontroller is done in C.

Contents
In this course the aspects of microcontroller programming are given in a project-based
learning approach. In this way the following subjects are learned in a practical way:
• Operations in different codes
• Addressing Modes (inherent, direct, absolute, relative, immediate, indexed)
• Instruction Set
• Register set (Accumulators, Stack Pointer, Program Counter, Index register, -
  Condition Code Register)
• The Stack
• Interrupts
• I/O ports
• Timers
In summary:
• The project requires the students, organised in small groups, to actually develop and
  implement a simple application on a simple, microcontroller based application
  platform.
• This application could pose some specific requirements, such as real-time behavior,
  or specific user interface requirements.
• The goals invariably imply pursuing quality, efficiency, and optimality.
• The project could contain a competitive component.
• Such a project brings the student in close contact with a simple processor
  architecture and learns how to observe such a system (using equipment such as in-
  circuit emulators etc).
• He/she experiences how high-level programs are implemented on simple
  architectures and how such architectures interact.
• In this way, besides contributing to autonomous activity and creativity, the project
  contributes to the mastering of much more complex concepts that are addressed
  later in the programme.

Initial competences

(Approved)
followed the course "Basic electronics" and "Informatics"

Final competences

1. Knowing the internal structure and operation of a microcontroller and its main functional blocks.

2. Independently locating the correct data in the datasheet to set appropriate registers in a microcontroller

3. Testing, measuring and debugging a microcontroller

4. Be able to analyse simple problems and implement their solution on a microcontroller based platform

5. Using C to configure and program a microcontroller

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

Lecture, practicum

Extra information on the teaching methods

Lecture 24.0 h, practicum 36.0 h

Learning materials and price

All equipment for simple microprocessor experiments: prototyping boards, compilers, emulators. Software tools for developing applications on this platform. Supplied by the UGent.

References

Course content-related study coaching

Interactively during theory sessions or labs or after individual appointment with the teacher

Evaluation methods

continuous assessment

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

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

Examination methods in case of permanent evaluation

Oral examination, participation, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

During semester: graded project reports; graded oral presentation.

Calculation of the examination mark

Report: 25%
Presentation: 25%
Code: 25%
Demonstration: 25%

(Approved)