GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Electronics II (E702040)

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 1)	Dutch	Gent	lecture
			practical

Lecturers in academic year 2023-2024

Lambrecht, Stefaan	TW05	lecturer-in-charge

Offered in the following programmes in 2023-2024	**crdts**	**offering**
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
Linking Course Master of Science in Electrical Engineering Technology(main subject Automation)	6	A
Linking Course Master of Science in Electrical Engineering Technology(main subject Electrical Engineering)	6	A

Teaching languages

Dutch

Keywords

Electronics, digital, operational amplifiers, AD/DA, voltage regulator

Position of the course

This course consists of two parts: analog electronics and digital circuits. Both parts consist of a theoretical and a practical part.
Part digital electronics: design of basic digital circuits
Part analog electronics: Basic circuits with operational amplifiers, analog/digital and digital/analog conversion and voltage regulators.

Contents

1. **Digital electronics**

Lecture

- Boolean algebra: commutative, associative and distributive laws, reduction rules, duality laws of De Morgan, truth table and time sequence diagrams, Karnaugh-Veith diagrams
- Design of combinatorial circuits
- Adders, decoders, comparators, multiplexers
- Sequential circuits: flip flops, counters, shift registers
- Synchronous versus asynchronous design

Practical

Sequential and combinational digital circuits are designed, implemented and tested.

2. **Analog electronics**

Lecture

- Basic circuits with operational amplifiers
- Non-ideal characteristics of OpAmps
- Inverting, non-inverting, integrator, differentiator, instrumentation amplifier
- Static specifications: offset, open loop gain, CMRR, PSRR
- Frequency response of operational amplifiers
- AD/DA conversion

- Voltage regulators

Practical

In the laboratory, a number of basic circuits will be measured and analyzed.

Initial competences

Successfully having completed the courses 'Electricity' and 'Electronics-I' or having acquired the necessary competences in another way.

Final competences

1 Knowledge of Boolean algebra and logic gates
2 Understand the operation of combinational and sequential basic circuits
3 Be able to design and realize basic digital systems
4 Knows the AD and DA interfacing of digital systems
5 Can describe the fundamental circuits with operational amplifiers
6 Can design and build circuits with operational amplifiers
7 Understand how voltage regulators work
8 Critically approaching of measurement results and linking with theoretical models

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, Practical

Learning materials and price

Analog electronics

- Electronic devices, conventional current version, Global Edition, Thomas L. Floyd, 10th edition (ISBN-13: 978-1-29-222299-8)
- Price 89.00 euro
- Slides available on the electronic learning platform
- Practicum notes available on the electronic learning platform

Digital electronics

- Digital Fundamentals: Thomas L. Floyd, International edition (ISBN 978-0-138-146446-7)
- Price 81.00 euro
- Slides available on the electronic learning platform
- Practicum notes available on the electronic learning platform

References

Course content-related study coaching

Interactive (exercises) or individual

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

Participation

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

First examination period:

PGE1: Theory analog and digital electronics: written examination with closed book
NPGE: lab: permanent evaluation

Second examination period:

PGE2: Theory analog and digital electronics: written examination with closed book
NPGE: lab: examination during the second examination period is not possible: transfer points first examination period.

Calculation of the examination mark

- 2/3 theory and 1/3 lab
- When the student scores less than 8/20 for one of the 2 components (theory and lab) he/she can no longer pass the entire course unit. If the total score is a mark of ten or more out of twenty, then this is reduced to the highest failing mark (9/20)
- Students who eschew one part of the evaluation can no longer pass the course. Final scores will be reduced to the highest non-deliberative quotation (7/20) if the final score would be higher than 7/20.
- During the practical exercises students are questioned on the reports of the tests that they have conducted. On this basis, and the performance during the practical exercises there will be a global assessment for this practicum. The final score for the practical exercises is obtained by multiplying the overall assessment for the practical exercises by (12-X)/12, where X is the number of illegitimate absences. A legitimate absence should not be overtaken.