GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Electronics II (E620400)

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	Kortrijk	lecture
			practical

Lecturers in academic year 2023-2024

Willems, Brecht	TW06	staff member
Lemey, Sam	TW05	lecturer-in-charge
Stroobandt, Dirk	TW06	co-lecturer

Offered in the following programmes in 2023-2024	crdts	offering
Bachelor of Science in Engineering Technology(main subject Machine and Production Automation)	6	A
Master of Science in Industrial Design Engineering Technology	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 and realization of basic digital circuits
- Part analog electronics: Basic circuits with operational amplifiers, analog/digital and digital/analog conversion, and voltage regulators.

Contents

Digital electronics

Lecture (12u)

- Boolean algebra: in-depth study of 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 (12u)

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

Analog electronics

Lecture (24u)

- Basic circuits with operational amplifiers
- Non-ideal characteristics of operational amplifiers
- 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 (12u)

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

Initial competences

Successfully having completed the courses 'Electricity' and 'Electronics' 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 Describe and apply the AD and DA interfacing of digital systems
5 Describe the fundamental circuits with operational amplifiers
6 Design and build circuits with operational amplifiers
7 Describe 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

- English textbook: Electronic devices, conventional current version, Pearson Global Edition, Thomas L. Floyd, 10th edition (ISBN-13: 978-1-29-222299-8)
- Price 81.00 euro
- Slides available on Ufora
- Practicum notes available on Ufora

Digital electronics

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

References

Course content-related study coaching

Interactive (during exercises and/or lab sessions) or individual by appointment

Assessment moments

end-of-term and continuous assessment

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

Written assessment

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

Written assessment

Examination methods in case of permanent assessment

Participation, Written assessment, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

First examination period:

- PGE1: Theory analog electronics: written examination with closed book
- PGE1: Theory digital electronics: written examination with closed book
- NPGE: lab: lab-examination with open book, participation and report.

Second examination period:

- PGE2: Theory analog electronics: written examination with closed book
- PGE2: Theory digital electronics: written examination with closed book
- NPGE: lab: lab-examination with open book and/or report.

Calculation of the examination mark

- 60% analog electronics (2/3 theory and 1/3 lab) + 40% digital electronics (2/3 theory and 1/3 lab).
- When the student scores less than 8/20 for one of the two parts (part I: theory, part II: 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 or more parts 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.
- The final score for the practical exercises is obtained by multiplying the assessment for the practical exercises (lab-examination) by (12-X)/12, where X is the number of illegitimate absences. A legitimate absence should not be overtaken.
- For the lab, only 20% can be retaken in the second examination period.