GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Electronics (E610055)

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

Credits 3.0 **Study time 90 h**

Course offerings and teaching methods in academic year 2023-2024

A (semester 2)	Dutch	Kortrijk	lecture
			practical

Lecturers in academic year 2023-2024

Willems, Brecht	TWO6	staff member
Lemey, Sam	TWO5	lecturer-in-charge

Offered in the following programmes in 2023-2024	crdts	offering
Bachelor of Science in Engineering Technology(main subject Machine and Production Automation)	3	A
Bachelor of Science in Bioindustrial Sciences	3	A
Bachelor of Science in Industrial Design Engineering Technology	3	A
Bachelor of Science in Engineering Technology (Joint Section)	3	A
Linking Course Master of Science in Industrial Design Engineering Technology	3	A

Teaching languages

Dutch

Keywords

Semiconductor technology, diodes, bipolar transistors, field-effect transistors, diode circuits, transistor circuits

Position of the course

The course has the following objectives:

- Acquire basic knowledge in the field of electronics and gain insight in its recent developments.
- Be able to describe and to analyse diverse electronic systems and their components in the domain of everyday electronics.
- During the practicum sessions, theoretical principles are practiced and realistic electronic circuits are calculated. The obtained results are compared with simulations and, if possible, with practical measurements. Operational and non-operational circuits are examined by means of datasheets to analyse and prevent errors.

Contents

- Introduction: history, important quantities, basic components
- Semiconductor technology: the atom model, N-type and P-type semiconductors, the PN-junction
- Diodes and applications: diode operation, voltage-current characteristic, diode models, rectifier circuits and other applications
- Special-purpose diodes: Zener, varactor, optical diode
- Bipolar Junction Transistors: basic BJT operation, characteristics and parameters, the BJT as amplifier, the BJT as switch, phototransistor
- Transistor circuits: DC operating point, bias methods, common-emitter amplifier, common-collector amplifier, common-base amplifier
- Field-Effect Transistors: JFET characteristics and parameters, MOSFET characteristics and parameters

Initial competences

Builds upon certain final competences of the course 'Electricity'.

Final competences

1 Recognise and analyse electronic systems.
2 Explain the operation principles of electronic semiconductor components, such as the diode and the transistor.
3 Explain the operation of basic diode and transistor circuits.
4 Be able to independently analyse a basic electronic system.

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

Extra information on the teaching methods

Lecture 18.0u, Practicum 12.0u

Learning materials and price

- English textbook: Electronic devices (price ca. 80 EUR, conventional current version, Global edition, Thomas L. Floyd, 10th edition (ISBN-13: 978-1-29-222299-8)
- Hand-outs of the slides and additional documentation are available on the electronic learning environment.

References

Course content-related study coaching

The lecturers are available for further information via various channels (during and/or after the course or 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

Written assessment, 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

PE1 and PE2: Written examination
NPE: The practicum sessions are examined by means of a report and a written exam based on the lab content (outside the examination period).

Calculation of the examination mark

- Final score (/20) = 2/3 theory + 1/3 practicum
- 2 illegitimate absences during practicum sessions will result in a score AFW (Not Present) as a final mark.
- First and second examination period: to pass the course, at least 7/20 for Theory and Practicum has to be obtained. If this condition is not met, there will be a modification of the calculated number to 9/20, if it is 10 or more.
- For the practicum, only 40% can be retaken in the second examination.