GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Electronic Systems and Instrumentation for Biomedical Engineers (E032511)

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

Credits 5.0 **Study time 150 h**

Course offerings and teaching methods in academic year 2026-2027

A (semester 2)	Dutch	Gent	lecture	0.0h
			practical	0.0h

Lecturers in academic year 2026-2027

Doutreloigne, Jan	TW06	lecturer-in-charge
Bauwens, Pieter	TW06	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
Bachelor of Science in Engineering(main subject Biomedical Engineering)	5	A
Preparatory Course Master of Science in Biomedical Engineering	5	A

Teaching languages

Dutch

Keywords

Electronic instrumentation, analog and digital circuits, sensors and actuators, control systems, data acquisition, system analysis, bio-electronics

Position of the course

The course provides a general introduction into the analysis of electronic instrumentation. The course covers the analysis of electronic circuits (digital and analog), principles of electronic measurements, sensors, data acquisition and signal processing of measurement data. These principles are applied to simple systems from bioelectronics.

Contents

- Overview of electronic components and building blocks: active and passive components, analog building blocks, digital building blocks
- Analysis of analog and digital electronic circuits: transistor circuits, opamp circuits, combinational and sequential digital circuits
- Analysis of complete openloop and closedloop electronic instrumentation systems
- Principles of bio-electronics: biopotentials, electrodes on the human body, conduction of living tissue, safety, isolation

Initial competences

Electrical circuits and networks

Final competences

1 Understand the operation of the basic electronic components
2 Analyze basic analog and digital electronic circuits and think about them in a conceptual, analytical and systemoriented way.
3 Have the skills to perform numerical simulations on electronic circuits using standard models and methods, in particular PSpice.
4 To be able to build and experimentally evaluate analog and digital circuits at breadboard level with the required accuracy, perseverance and critical reflection.
5 Have the skills to communicate about your own electronic system design via written text and graphs.
6 Have insight in the acquisition of biopotentials such as in ECG or EEG systems.

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

Classroom lectures: theoretical lectures
Lab sessions: build and experimentally evaluate electronic circuits, to be carried out in groups of 2 or 3 students

Study material

Type: Slides

Name: Extensive set of detailed PowerPoint slides about 4 chapters that can be downloaded for free from the Ufora website
Indicative price: Free or paid by faculty
Optional: no
Language : Dutch
Number of Slides : 420
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

References

Course content-related study coaching

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

Skills test

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

During examination period: written exam, partly closed-book theory, and partly closed-book exercises.
Permanent evaluation: individual closed-book lab exam at the end of the semester (calculations + circuit building + experimental evaluation of the circuit).

Calculation of the examination mark

During examination period: written exam that represents 2/3 of the total score.
Permanent evaluation: lab exam that represents 1/3 of the total score.