GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Analogue Design (E735026)

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

Van Torre, Patrick	TW05	lecturer-in-charge

Offered in the following programmes in 2023-2024	**crdts**	**offering**
Master of Science in Electronics and ICT Engineering Technology(main subject Electronics Engineering)	6	A
Exchange Programme Electronics and ICT Engineering Technology	6	A

Teaching languages

Dutch

Keywords

Design techniques, Switched capacitor techniques, phase-locked loop (PLL), Operational Transconductance Amplifier (OTA), Current-Feedback OpAmps, Class-D amplifiers, superheterodyne receivers, noise in amplifiers, THD

Position of the course

Design, simulation and practical realisation of advanced analogue circuits. Written report and presentation thereof.

Contents

- Switched capacitor techniques
- Phase-Locked Loop (PLL)
- Operational Transconductance Amplifier (OTA)
- Current-Feedback OpAmps
- Class-D amplifiers
- Superheterodyne receivers
- Noise behavior of amplifiers
- Total Harmonic Distortion (THD)
- Analysis of complex designs, containing analogue circuits
- Practical realisation of a complex analogue circuit. Test and measurement; documenting and presenting the information.

Initial competences

This course unit builds on certain course competencies/learning outcomes of course units Analogue Electronics I & II

Final competences

1 To analyse and design complex analogue systems
2 To practically realise complex analogue 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

Lectures:
- Theory of the topics mentioned above.
- Theory behind the lab projects.
Lab sessions: Project: design of class D audio power amplifier

Learning materials and price

Available in the digital learning environment

References

"Microelectronic circuits and devices", Mark N. Horenstein.
"Design and applications of analog integrated circuits", Sidney Soclof.
"Design of analog integrated circuits and systems", Kenneth Laker & Willy Sansen.
"Analysis and design of analog integrated circuits", Paul Gray, Paul Hurst, Stephen Lewis and Robert Meyer.
"Digital PLL frequency synthesizers: theory and design", Ulrich L. Rohde.

Course content-related study coaching

The students are expected to study independently and use the self-taught and taught knowledge individually and in group, supported by the instructor.
Theory: Additional advice possible by email; an appointment can also be arranged.
Lab session: Permanent guidance during the lab. Additional lab meetings can be arranged at the student's request.

In case of sanitary measures, as due to the covid pandemic, on campus activities can be substituted by online activities.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment

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

Oral assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

Theory: On-campus oral closed-book exam about the theory of the lectures + the knowledge acquired during the lab project.
Lab sessions: Assessment based on the written project report and presentation thereof. This assessment is supported by permanent evaluation during the course of the project.
First and second exam period: in order to pass the course a minimum mark of 8/20 should be obtained for the theory part. In case this condition is not fulfilled, an average mark of 10/20 or more is reduced to 9/20.

Calculation of the examination mark

Theory 2/3: oral exam
Lab 1/3: report, presentation, permanent evalulation during semester