GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

VLSI Technology and Design (E031440)

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 2026-2027

A (semester 1)	English	Gent	lecture	
			practical	0.0h
B (semester 1)	Dutch	Gent	practical	0.0h
			independent work	0.0h

Lecturers in academic year 2026-2027

Doutreloigne, Jan	TW06	lecturer-in-charge

Offered in the following programmes in 2026-2027	**crdts**	**offering**
Bridging Programme Master of Science in Electrical Engineering(main subject Electronic Circuits and Systems)	6	A
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	6	A
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	A
Master of Science in Electrical Engineering	6	B
Master of Science in Photonics Engineering	6	A

Teaching languages

English, Dutch

Keywords

VLSI, IC, CMOS, technology, design, simulation, PCB, layout

Position of the course

This course describes the basic technology and process flow for the fabrication of integrated CMOS circuits. Also the design (simulation on the basis of SPICE models and manual mask layout) of such CMOS ICs is extensively studied. Finally the course also pays attention to the interconnection of ICs by means of printed circuit boards (PCBs).

Contents

- VLSI technology: semiconductor physics, MOSFET, microelectronics and microsystems, process flow of an IC technology, packaging and assembly, multilayer PCB technology, virtual wafer fab
- VLSI design: SPICE modelling, CMOS IC design, parameter extraction, PCB design

Initial competences

basic knowledge of electronics

Final competences

1 Understand the process flow of modern IC technologies
2 Simulate and layout electronic circuits in modern IC technologies

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, Independent work

Extra information on the teaching methods

Classroom lectures; Practical sessions to be carried out in groups of 2 to 3 students

Study material

Type: Slides

Name: Extensive set of detailed PowerPoint slides about 3 chapters that can be downloaded for free from the Ufora website
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Slides : 260
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

References

- S.M. Sze, "VLSI technology", McGraw-Hill, New York 1988
- C.Y. Chang end S.M.Sze, "ULSI technology", McGraw-Hill, New York 1996
- C.F. Coombs, "Printed Circuits Handbook", McGraw-Hill, New York 1995
- R.L. Geiger, P.E. Allen, N.R. Strader, "VLSI design techniques for analog and digital circuits", McGraw-Hill, New York 1993

Course content-related study coaching

Continuous guidance/support, for the theoretical classes as well as for the design project, during the whole semester by the responsible professor and a scientific coworker.

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 possible in modified form

Extra information on the examination methods

During examination period: oral closed-book examination.
Outside examination period: report of the IC design project that takes about 1 month time (schematic design + simulations + layout).

Calculation of the examination mark

Evaluation during examination period: 70%
Evaluation outside examination period: 30%