GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2016-2017

VLSI Technology and Design (E031440)

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

Credits 6.0	**Study time 180 h**	**Contact hrs**	67.5 h

Course offerings and teaching methods in academic year 2016-2017

A (semester 1)	project	30.0 h
	lecture	30.0 h
B (semester 1)	guided self-study	30.0 h
	project	30.0 h

Lecturers in academic year 2016-2017

Doutreloigne, Jan	TW06	lecturer-in-charge

Offered in the following programmes in 2016-2017	crdts	offering
Bridging Programme Master of Science in Electrical Engineering (main subject Communication and Information Technology)	6	A
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 Electromechanical Engineering (main subject Control Engineering and Automation)	6	A
Master of Science in Electromechanical Engineering (main subject Electrical Power Engineering)	6	A
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	A
Master of Science in Electromechanical Engineering (main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering (main subject Mechanical Construction)	6	A
Master of Science in Electromechanical Engineering (main subject Mechanical Energy Engineering)	6	A
Master of Science in Electrical Engineering	6	B
Master of Science in Photonics Engineering	6	A

Teaching languages

Dutch, English

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

Guided self-study, lecture, project

Extra information on the teaching methods

Classroom lectures; Projects

Learning materials and price

course notes can be downloaded from Minerva for free

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.

Evaluation methods

end-of-term evaluation and continuous assessment

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

Oral examination

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

Oral examination

Examination methods in case of permanent evaluation

Report

Possibilities of retake in case of permanent evaluation

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%