Course Specifications

Valid as from the academic year 2016-2017

Technology of Integrated Circuits and Microsystems (E031420)

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

Credits 6.0	**Study time 180 h**	**Contact hrs**	60.0 h

Course offerings and teaching methods in academic year 2016-2017

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

Lecturers in academic year 2016-2017

Bosman, Erwin	TW06	lecturer-in-charge
Vanfleteren, Jan	TW06	co-lecturer

Offered in the following programmes in 2016-2017	crdts	offering
Bridging Programme Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	B
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	B
Master of Science in Biomedical Engineering	6	B
International Master of Science in Biomedical Engineering	6	B
Master of Science in Biomedical Engineering	6	B
Master of Science in Electrical Engineering	6	A
Master of Science in Engineering Physics	6	B
Master of Science in Engineering Physics	6	A

Teaching languages

Dutch, English

Keywords

cmos, fabrication, mems, microsystems, technology, PCB

Position of the course

The purpose of this course is to acquaint students with the various technologies for the realization of integrated circuits, printed circuit boards, microfluidic systems and microelectromechanical systems (MEMS). First, the different fabrication technologies are described that serve as the basis for any advanced micro-and nanotechnology (deposition, lithography, etching ...), followed by the realization of different microsystem components (cmos chips, microfluidic components, MEMS and chip packages) and interconnection systems (printed circuit boards, flexible and stretchable electronics)

Contents

- Basic technology steps: deposition, lithography, etching, laserstructuring, ...
- Microsystem components: cmos chips, microfulidic components, MEMS and chip packages
- Advanced integrated microsystems: electrical PCB's, optical PCB's, flexible & stretchable microsystems
- Practicum polymer microsystems: fabrication and characterization
- Literature paper study

Initial competences

Basic knowledge physics, chemistry and electronics

Final competences

1 detailed knowledge on microsystems process steps
2 basic knowledge on different types of microsystems
3 insight in the physics of microfabrication
4 practical experience on the characterization of microfeatures
5 practical experience in cleanroom laboratories
6 analysis and synthesis of a scientific article
7 writing of a scientific report

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

handouts of class room lecture presentations; selected scientific publications for selfstudy

References

- S. Franssila : "Introduction to Microfabrication", 2nd edition, Wiley, 2010
- M. Madou : "Fundamentals of Microfabrication", 3rd edition, CRC Press, 2011

Course content-related study coaching

Personal contact with 3 scientific researchers and interactive support through the Minerva-portal

Evaluation methods

end-of-term evaluation

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

Open book examination, oral examination, report

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

Open book examination, oral examination, report

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

During examination period: evaluation of graded project reports, understand and explain 1 scientific article, explain course material using handouts (open book)

Calculation of the examination mark

Evaluation during examination period
In case of unauthorized absence during the practicum, the student is obliged to join a later practicum session, if a later session is taking place. If not, the student will receive a 0-score for the practicum report