

## 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 2019-2020

Offering	Language	Teaching Methods	Hours
A (semester 1)	Dutch	project	30.0 h
		self-reliant study activities	30.0 h
B (semester 1)	English	excursion	5.0 h
		seminar: coached exercises	5.0 h
		lecture	45.0 h
		project	5.0 h

### Lecturers in academic year 2019-2020

Op de Beeck, Maaïke	TW06	lecturer-in-charge
Vanfleteren, Jan	TW06	co-lecturer

### Offered in the following programmes in 2019-2020

Programme	crdts	offering
<a href="#">Bridging Programme Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)</a>	6	B
<a href="#">Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)</a>	6	B
<a href="#">Master of Science in Electrical Engineering</a>	6	A
<a href="#">Master of Science in Engineering Physics</a>	6	B
<a href="#">Master of Science in Engineering Physics</a>	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, microfluidic components, MEMS and chip packages
- Advanced integrated microsystems: electrical PCB's, optical PCB's, flexible & stretchable microsystems
- Practicum : clean room visit and exercises
- 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 in cleanroom laboratories
- 5 analysis and synthesis of a scientific article
- 6 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

Demonstration, excursion, lecture, project, self-reliant study activities, seminar: coached exercises

## Extra information on the teaching methods

Demonstration : clean room visit  
Excursion : company visit  
Individual work : literature study  
project: in small groups critical reading of text about microfabrication, presentation of content

## Learning materials and price

handouts of class room lecture presentations; selected scientific publications for self study and for project

## 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 professors and several scientific researchers; interactive support through the electronic learning platform

## Evaluation methods

end-of-term evaluation

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

Open book examination, oral examination, participation, report

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

Open book examination, oral examination, participation, 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: explain course material using handouts (open book); understand and explain 1 scientific article; evaluation of practicum report.

## Calculation of the examination mark

Evaluation during examination period (max. score is 80% of the total score)  
For the practicum report, a maximum of 10% of the total score can be earned. 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.  
For the project work, a maximum of 10% of the total score can be earned.  
In case of unauthorised absence during the company visit, the student loses 1 point (on 20).