

## 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
<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 Biomedical Engineering</a>	6	B
<a href="#">International Master of Science in Biomedical Engineering</a>	6	B
<a href="#">Master of Science in Biomedical Engineering</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 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