MICRO-621

MOOC: Micro and Nanofabrication (MEMS)

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Cursus	Sem.	Type
Advanced Manufacturing		Obl.
Microsystems and Microelectronics		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Oral
Workload	30h
Hours	**28**
Courses	14
Exercises	14
Number of positions	

Frequency

Every year

Remark

From September 19 to October 31, 2017

Summary

Micro- and nanofabrication can be taught to students and professionals by textbooks and ex-cathedra lectures, but the real learning comes from seeing the manufacturing steps as they happen. This MOOC will not only explain the basics of microfabrication but also show the practice through videos.

Content

Microfabrication and nanofabrication are the basis of manufacturing for nearly all modern miniaturized systems that are ubiquitously used in our daily life. Examples include; computer chips and integrated sensors for monitoring our environment, cars, mobile phones, medical devices and more.
Micro- and nanofabrication can be taught to students and professionals by textbooks and ex-cathedra lectures, but the real learning comes from seeing the manufacturing steps as they happen.
In this engineering course, we will go a step beyond classroom teaching to not only explain the basics of each fabrication step but also show you how it’s done through video sequences and zooming into the equipment.

Course Syllabus
Week 1: MEMS and cleanroom introduction
Week 2: Chemical vapour deposition (CVD)
Week 3: Physical vapour deposition (PVD)
Week 4: Lithography
Week 5: Dry etching
Week 6: Wet etching
Week 7: Metrology

Note

PhD students will follow the MOOC on micro and nanofabrication (scheduled during 7 weeks at the beginning of each fall semester). The students will also take part in the online questions and quizzes. At the end we set up an oral exam with the teachers.

Keywords

microfabrication, cleanroom techniques, theory and visual demonstration by video sequences, quizzes.

Learning Prerequisites

Required courses

basics of physics and chemistry

Recommended courses

none

Learning Outcomes

By the end of the course, the student must be able to:

- Select appropriately the correct fabrication process for a specific micro-device or microsystem
- Establish the workflow for the cleanroom processes
- Identify how physical and chemical phenomena govern miniaturized systems for various applications
- Manage Resource planning for a given microsystem fabrication

Resources

Bibliography

- "Fundamentals of Microfabrication and Nanotechnology, Volume II, Manufacturing Techniques for Microfabrication and Nanotechnology", Marc J. Madou, CRC Press
- "Introduction to Microfabrication, Second Edition", Sami Franssila, Wiley

Ressources en bibliothèque

- Fundamentals of Microfabrication and Nanotechnology, Vol II / Madou
- Introduction to Microfabrication / Franssila

Notes/Handbook

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Websites

- https://www.edx.org/course/micro-nanofabrication-mems-epflx-memsx#!