MICRO-501

MEMS Actuator practicals

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Cursus	Sem.	Type
Microengineering minor	H	Opt.
Microtechnics	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Withdrawal	Unauthorized
Session	Winter
Semester	Fall
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
TP	3 weekly
Number of positions	

It is not allowed to withdraw from this subject after the registration deadline.

Summary

The goal of this practical work is to create thermal micro-actuators consisting of micro-cantilevers made out of silicon dioxide and covered by chromium meander-shaped electrical tracks and contact pads.

Content

Theory, mask design, cleanroom fabrication, COMSOL simulation, characterization.

Keywords

bimorph cantilever, cleanroom fabrication

Learning Prerequisites

Recommended courses

MICRO-331

Important concepts to start the course

fundamentals of cleanroom microfabrication

Learning Outcomes

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

- Analyze a cleanroom process flow
- Design a mask for photolithography
- Perform a simple cantilever simulation with COMSOL
- Operate with supervision in a cleanroom environment
- Characterize a cantilever movement with a simple optical setup

Transversal skills

- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Demonstrate the capacity for critical thinking

Teaching methods

The student will be involved with all aspects of the microsystem fabrication: design, simulation, cleanroom processing, characterization.
This course is given in group of 3 students who work closely together with a PhD student to go through the entire run of a MEMS process. The teaching is thus based on hands-on training accompanied by literature/process flow study, design optimization and final characterization.

Expected student activities

design, fabrication in the cleanroom, characterization, reporting.

Assessment methods

Three reports will be evaluated aling the semester.
The written report must be submitted no later than Friday of the second week after the end of the lessons

Supervision

Assistant.e.s	Yes

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

See the moodle.

Notes/Handbook

There are some online notes in the moodle.

Moodle Link

- https://go.epfl.ch/MICRO-501

Prerequisite for

No.