MICRO-431 **Materials and technology of microfabrication**

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Cursus	Sem.	Type
Microtechnics	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Oral
Workload	90h
Weeks	14
Hours	**3 weekly**
Lecture	2 weekly
Exercises	1 weekly
Number of positions	

Summary

The student will learn procedures and applications of modern microfabrication technologies, as practiced in a clean room environment, in particular modern techniques that go beyond the classical steps of deposition, lithography and etching, with a focus on materials and multidisciplinarity.

Content

1. Elements of mainstream Si technology
2. Multilayer poly-Si micromachining
3. Glass microfabrication
4. Polymer microfabrication
5. Bonding and gluing technologies
6. Electroplating and the LIGA technique
7. Biosensor technologies
8. 3D printing or added manufacturing
9. Microfluidic bioseparation techniques
10. Magnetic labs-on-a chip

Learning Prerequisites

Recommended courses

Microstructure fabrication technologies I.

Learning Outcomes

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

- Choose for micro-engineered devices for a specific application.
- Design a process workflow for microfabrication.
- Differentiate the potential of different technologies for a given application.
- Identify the role of basic physical and chemical phenomena in modern miniaturized devices.
- Contextualise the use of microfabrication techniques for a given application.

Transversal skills

- Make an oral presentation.
- Summarize an article or a technical report.

- Access and evaluate appropriate sources of information.
- Keep appropriate documentation for group meetings.
- Communicate effectively, being understood, including across different languages and cultures.

Teaching methods

Lectures and personal study and presentation of relevant papers related to microfabrication by the student.

Assessment methods

Oral examination

Resources

Bibliography

M. Madou, Fundamentals of Microfabrication, 2nd edition, CRC Press, Boca Raton (2002).
S. Franssila, Introduction to Microfabrication, 2nd edition, Wiley, Chicester UK (2010).

Ressources en bibliothèque

- Introduction to Microfabrication / Franssila
- Fundamentals of Microfabrication / Madou

Notes/Handbook

Notes by the instructors.

Moodle Link

- https://go.epfl.ch/MICRO-431