Materials and technology of microfabrication

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Cursus

Microtechnique

Sem. MA1, MA3
Type Obl.

Language

English
Credits
3
Session
Winter
Semester
Fall
Exam
Oral
Workload
90h
Weeks
14
Hours
3 weekly
Lecture
2 weekly
Exercises
1 weekly

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

Ressources en bibliothèque
• Fundamentals of Microfabrication / Madou
• Introduction to Microfabrication / Franssila

Notes/Handbook
Notes by the instructors.