MICRO-605

Optical MEMS and micro-optics

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Cursus	Sem.	Type
Microsystems and Microelectronics		Obl.
Photonics		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Oral
Workload	30h
Hours	**14**
Lecture	14
Number of positions	**20**

Frequency

Every year

Remark

November 18 to 21, 2019

Summary

Micro-optics and optical MEMS comprise advanced techniques to manipulate light with superior precision and speed to realize compact yet versatile optoelectronic systems. MICRO605 covers the necessary theory, basic practical aspects, and the device and system concepts for these closely related fields

Content

1. Microoptics

a) Propagation of light (Fourier optics)
b) Diffractive optics and holograms
c) Examples: (microlenses, diffractive optical elements (DOEs), micromirrors)
d) Simulation of optics: matrix method, ABCD law, and Optical CAD
e) Effects of real microoptical elements in an optical path (diffraction, aberrations, fill factor)
f) System concepts
g) Microfabrication of optical microstructures (microlenses and DOEs)
h) Limits of miniaturization
i) Moving towards the nanoscale

2. Optical MEMS (MOEMS)
a) Review of fabrication methods and their limitations
b) Characterization techniques
c) Actuators and position sensors
d) Micromirrors
e) Tunable gratings
f) Tunable lenses
g) Tunable resonators
h) Examples of optical MEMS applications

Learning Prerequisites

Recommended courses

- Introductory course to optics and microfabrication technologies
- Basics of chemistry and physics

Resources

Websites

- http://opt.epfl.ch/