

Nanotechnology

Micro-, Nano-Photonics and applications

IDENTIFICATION

CODE : M2-NANO-NANO-S3-1
ECTS : 6.0

HOURS

Lectures :	32.0 h
Seminars :	6.0 h
Laboratory :	10.0 h
Project :	0.0 h
Teacher-student contact :	48.0 h
Personal work :	15.0 h
Total :	63.0 h

ASSESSMENT METHOD

Final written exam
Intermediate written exam
Graded reports on lab practicals
Evaluation of literature review

TEACHING AIDS

TEACHING LANGUAGE

English

CONTACT

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AIMS

The main topic of this course is the generation, the manipulation and the detection of light at microscopic and nanoscopic scales. Different kinds of applications are introduced, including information and data processing, solar energy harvesting and life sciences.

CONTENT

The course is divided in 15 lectures and 2 practicals:

- lecture 1: introduction to photonics, microphotonics, nanophotonics and biophotonics
- lecture 2: basic knowledge of optics
- lecture 3-4: guiding light
- lecture 5-6: localization of light (cavities, photonic crystals, metamaterials)
- lecture 7-8: absorption, emission, laser physics
- lecture 9-10: plasmons
- lecture 11-12: biophotonics, single molecules and optical tweezers
- lecture 13: opto-fluidics
- lecture 14: non-linear guided optics
- lecture 15: bibliography and research articles on micro- and nanophotonics
- practical 1: simulation of photonic devices and circuits
- practical 2: characterization and testing of microlasers

BIBLIOGRAPHY

Bahaa E.A. Saleh, Marvin C. Teich, "Fundamentals of photonics", Wiley, New York, second edition, 2007.

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