PHYS-602 **Nanophotonics and plasmonics**

Martin Olivier

Cursus	Sem.	Type
Photonics		Obl.

Language of teaching	English
Credits	3
Session	
Exam	Oral presentation
Workload	90h
Hours	**42**
Courses	28
Exercises	14
Number of positions	

Frequency

Every 3 years

Remark

Next time: Spring 2020 - To be confirmed

Summary

The course will covers different aspects of plasmonics and nanophotonics, from fundamental principles to materials requirements, fabrication and characterization. In addition to lectures, there are numerical experiments to become familiar with the response of plasmonic systems and materials.

Content

- Introduction
- Light scattering
- Materials for plasmoncis
- Localized plasmon resonances
- Propagating plasmons
- Modelling plasmonic nanostructures
- Modes in plasmonics
- SERS and fluorescence
- Biosensing
- Nanofabrication for plasmonics
- Nonlinear plasmonics
- Coupled-oscillators models
- EELS
- Industrial applications
- Numerical experiments
- Project

Keywords

plasmonics, nanophotonics, optics of metals, electromagnetics, sensing, signal processing, materials sciences, nanotechnology

Learning Outcomes

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

- Analyze plasmonic systems
- Compute propagating and localized plasmon resonances
- Predict the response of plasmonic systems
- Explore applications of plasmonics
- Carry out further investigations
- Apply the taught concepts
- Make sense

Transversal skills

- Make an oral presentation.
- Write a literature review which assesses the state of the art.
- Demonstrate a capacity for creativity.
- Communicate effectively with professionals from other disciplines.
- Communicate effectively, being understood, including across different languages and cultures.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.

Resources

Websites

- http://nam.epfl.ch