Module: Specialization: Advanced Experimental Physics

Module No.: physics62a

Course: Photonics

Course No.: physics641

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	3+1	6	ST

Requirements for Participation:

Preparation:

Form of Testing and Examination:
Examination written or oral (announced at the beginning of the module).
Prerequisite for participation in the exam: successful work within the exercises.

Length of Course:
1 semester

Aims of the Course:
The lecture conveys the physical and technological foundations of laser-based photonics, and enables the students to practically apply their knowledge in research and development.

Contents of the Course:
Foundations: Advanced geometric and wave optics, Fourier optics;
Active and passive devices (Acoustooptics, electrooptics, detectors, imaging)
Advanced optics: Waveguides, Fibers; Photonic Crystals; Metamaterials; Resonators
Laser physics: Light-matter-interaction, principles, operation modes and properties
Nonlinear optics: Second- and third order processes, parametric oscillators, phase matching

Recommended Literature:
D. Meschede; Optics, Light and Lasers (Wiley-VCH, 3rd ed. 2017)
A. Yariv; Photonics: Optical Electronics in Modern Communications (Oxford Univ. Press 6th edition 2006)
B. Saleh, M. Teich; Fundamentals of Photonics (John Wiley & Sons, New York, 1991)
C. Yeh; Applied Photonics (Academic Press, 1994)
R. Menzel; Photonics (Springer, Berlin 2001)

You can not earn credit points for your master examination from this module once you have passed the module physics640: Photonic Devices