Photonics - physics641

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)

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