

<b>Module:</b>	<b>Specialization: Advanced Experimental Physics</b>
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Module No.: physics62a

<b>Course:</b>	 <b>Photonics</b>
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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