

Modulname Modulname	PI Optics and Laser Technology	416
Modulverantwortlicher/ Modulverantwortliche Module responsibility	Prof. Dr. Christian Rödel (Modulverantwortung)	
Qualifikationsziele Qualification goals	Students are introduced to the field of optics and laser technology. Fundamental concepts of optics and laser physics are discussed in the lecture, which are the basis of optical instruments and technologies with relevance in modern technology.	
Modulinhalte Module contents	Ray optics, Imaging, Optical Instruments, Aberrations, Optical Design with Ray Tracing Wave optics, diffraction, Fourier Optics, Resolution in Optical Imaging, Interference, Michelson Interferometer, Wavefront, Zernike Spectroscopy, Spectroscopic Instruments, Atomic Physics, Bohr model, Photoelectric Effect Laser Physics, Population Inversion, Rate Equations, Gas Lasers, Diode-Pumped Solid-State Lasers (DPSSL), Excimer Lasers, Pulsed Lasers, Q-Switching, Nonlinear Optics, Second Harmonic Generation Beam Optics, Gaussian Optics, Characterization of Laser Beam Profiles, Fiber Optics Detectors, Cameras, Charged Coupled Devices (CCD) High Intensity Laser Interactions, Material Processing, Short-Wavelength Sources, Applications Basic Concepts of Quantum Optics and Applications in Quantum Cryptography	
Lehrformen Forms of teaching	Vorlesung (3 SWS) Praktikum (1 SWS)	
Voraussetzungen für die Teilnahme Requirements for participation	Physics I & II	
Literatur/multimediale Lehr- und Lernprogramme Further readings/Learning programmes	1. Saleh, Teich, „Fundamentals of Photonics“, Wiley, 3rd Edition, 2019 2. Hecht, „Optics“, Pearson, 5th Edition, 2016	

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Lehrbriefautor Textbook author	keiner	
Verwendbarkeit Usability	Pool International (English Lectures for Contact students) F MB CP PI	
Arbeitsaufwand/Gesamtworkload Workload/Total workload	Präsenzzeit 60 h + Vorbereitung 90 h = 150 Stunden = 5,0 Credit Punkte presence 60 h + preparation 90 h = 150 hours = 5,0 credit points	
ECTS und Gewichtung der Note in der Gesamtnote ECTS and weighting in overall grade	5	1
Leistungsnachweis Performance record	oral exam (<20 Participants), written exam (>20 Participants)	
Semester Semester	1	
Häufigkeit des Angebots Frequency of the offer	annually in the winter semester	
Dauer Duration	1 Semester	
Art der Lehrveranstaltung Type of course	annually in winter semester	
Besonderes Peculiarity		

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