Module **PAFMO250** Physical Optics	
Modulecode	PAFMO250
Module title (German)	Physical Optics
Module title (English)	Physical Optics
Module Leader	Prof. Dr. H. Gross
Prerequisites for admission to Module	None
Recommended or expected prior knowledge	
Prerequisite for admission to other Modules	
Type of Module (compulsory Module, required elective Module, elective Module)	Required elective Module M.Sc. Physics focus „Optics“ Required elective Module M.Sc. Photonics Compulsory Module M.Sc. Medical Photonics
Frequency of Occurrence	Every second semester (beginning in summer semester)
Duration of Module	1 Semester
Module Components/ Types of courses (lecture, practical course, lab, tutorial, exercise, seminar, internship,…)	Lecture: 2 h per week Exercise: 2 h per week
Credits (ECTS)	4 ECTS
Work load: • In-class studying • Student managed learning	120 h 45 h 75 h
Content	• Wave optics, light propagation • Diffraction, slit, PSF, aberrations • Coherence, temporal and spatial, OCT, speckle • Laser, resonators, laser beams, pulses • Gaussian beams, propagation, generalizations, Schell beams • Fourier optics, resolution, image formation, OTF, criteria • Quality criteria of imaging • PSF engineering, superresolution, extended depth of focus • Confocal methods, laser scanning, metrology • Polarization, fundamentals, Jones vectors, birefringence • Photon optics, uncertainty, statistics • Scattering, surfaces, volume models, tissue optics • Miscellaneous, coatings, non-linear optics, short pulses

Learning outcomes	The course covers the basic understanding of physical optical subjects in the context of optical systems.
Prerequisites for admission to examination	
Assessment	written examination (100%)
Additional information	Parts of the lectures are given by a Dr. B. Böhme / C. Zeiss and M. Dienerowitz / Medical Faculty to include industrial and practical viewpoints.
Key Texts/ Literature	• Lecture materials • B. Saleh, M. Teich, Fundamentals of Photonics, Wiley, 2007 • W. Singer, M. Totzeck, H. Gross, Handbook of optical systems, Vol 2, Wiley, 2005 • J. Goodman, Introduction to Fourier Optics, Wiley, 2005 • A. Lipson / S. Lipson, Optical Physics, Cambridge 2011 • G. Reynolds / J. deVlies, The Physical Optics Notebook, SPIE Press, 2000 • J. Goodman, Statistical Optics, Wiley, 1985 • E. Hecht, Optics, deGruyter, 2014 • C. Brosseau, Polarized Light, Wiley, 1998 • J. Stover, Optical Scattering, McGrawHill, 1990 • M. Nieto-Vesperinas, Scattering and Diffraction in Physical Optics, World Scientific, 2016 • A. Siegman, Lasers, Oxford University, 1986 • F. Träger, Handbook of Lasers and Optics, Springer, 2007
Language of instruction	English