

Modulname	LASER and Technical Optics
Modulverantwortlicher/ Modulverantwortliche	Prof. Dr. Udo Behn
Qualifikationsziele	On completion of this course, the students should have some background knowledge on the wave properties of light. They should know the basic principles of optical imaging and they should be able to design and to calculate simple optical systems. Furthermore, the students should know the most important parameters to characterize a laser and to pick the right laser for the right application.
Modulinhalte	Wave optics (electromagnetic waves, spectrum, interference, temporal coherence, standing waves, resonance, longitudinal waves, propagation of light in matter, dispersion, reflection, refraction, total internal reflection, diffraction) Geometrical Optics (basic imaging rules, mirrors, thin lenses, thin lens combinations, Oblique-ray-method, concept of principal planes, optical instruments) Lasers (laser principles, light amplification, gain profile and longitudinal modes, resonators, transverse modes, generation of short pulses, frequency doubling, Gaussian beam properties, beam quality, non-Gaussian beams, application-relevant laser parameters and their measurement)
Lehrformen	Lectures and exercises, lab experiments, self-study
Voraussetzungen für die Teilnahme	Basic knowledge of wave physics and geometrical optics
Literatur/ multimediale Lehr-und Lernprogramme	
Lehrbriefautor	
Verwendbarkeit	Master Mechatronics (Mechanical Engineering).
Arbeitsaufwand/ Gesamtworkload	Lectures and exercises 45 h + lab 15h + self-studies 90 h = 150 hours = 5 credits
ECTS und Gewichtung der Note in der Gesamtnote	5 ECTS Gewichtung: 5/90
Leistungsnachweis	Written exam 120min, written lab reports Total grade = (2/3) written exam + (1/3) lab reports
Semester	winter semester
Häufigkeit des Angebots	annual
Dauer	one semester
Art der Lehrveranstaltung (Pflicht, Wahl, etc.)	Optional compulsory modul
Besonderes	