Module title	SM Code
Optoelectronics, LED & Lasertechnology	**OLL**

Module lecturer	Faculty
Prof. Dr. Heiko Unold	Electrical Engineering and Information Technology

Module language	Number of SWS / WSH	ETCS credits
English	4 SWS / WSH	5

Teaching format
Seminar-based teaching with approx. 50% lab course

Semester according to the study plan
7th semester (Bachelor)

Attendance/classroom hours	Additional independent study
56 hours	Preparation and follow-up work: 70 hours Exam preparation: 24 hours

Type of examination / Requirements for the award of the credit points
Portfolio assessment and oral exam

Teaching content

- Perception and description of light (lighting technology & radiation physics quantities, colorimetry)
- Fundamentals of technical optics (ray optics, matrix optics, real lenses, aberrations)
- Fundamentals of wave optics and applications (Fabry-Perot resonator, dielectric coatings, Gaussian beams, polarisation)
- Basic principle of optical detectors
- Semiconductor materials and structures for efficient generation of optical radiation (direct semiconductors, hetero quantum structures, efficiencies)
- Design, operation and measurement technology of modern power LEDs

- Overview of the operating principle, designs, operating modes, properties and applications of various laser types

Learning objective: Professional competence

After successfully completing this module, students will be able to

- use basic terms and measurements in lighting technology and optoelectronics in a meaningful way (1)
- correctly answer at least 40% of questions from a previously known selection of topics (see Teaching contents) and associated task types within the examination time (2)
- work independently in a team to successfully complete a self-selected project (optoelectronic measurement technology, simulation, construction of simple demonstrators) and present it in a comprehensible and competent manner (3)
- relate and understand given texts from specialist literature, possibly in connection with the lecture content (3, not examined)

Literature

Recommended reading

- Meschede, D. (2008). *Optik, Licht und Laser* (Third edition). Vieweg+Teubner
- Schubert, F. E. (2012). *Light-Emitting Diodes* (Second edition). Cambridge University Press
- Eichler, H. J., & Eichler, J. (2015). *Laser: Bauformen, Strahlführung, Anwendungen* (Eighth edition). Springer

The numbers in brackets indicate the levels to be achieved: (1)-know | (2)-can | (3)-understand and apply