Optoelectronics (Laboratory Internship)

Module Title	Optoelectronics (Lab)				
Module Title in German	Optoelektronik (Praktikum)				
Module Leader	Lothar Kempen				
Teaching Staff	Prof. Dr. Lothar Kempen, Prof. Dr. Dirk Rüter				
Course Language	German / English				
Code OE	Workload 180 h	Credits 6	Semester 6. Semester	Semester Offered Every Summer Semester	Duration 1 Semester

1	Type of Course Laboratory: 2h/week	Scheduled Learning 30 h	Independent Study 150 h	Approx. Number of Participants: max 15
2	**Learning Outcomes / Competences** **Upon successful completion of this module, students** • know the physical fundamentals of optoelectronic components • have basic theoretical and practical knowledge about optical communications and are able to select and size systems for a given application • know basic circuits for the operation of transmitters and receivers and can select and size the appropriate components • are able to drive laser diodes, calculate the light propagation and couple light into optical glass fibers • know fiberoptic components, can select them according to the application and can determine their properties • are able to operate typical fiberoptic measurement instruments and can interpret and analyze the result			
3	**Content** • Optical receiver and transmitter, sensitivity, bandwidth • Detection of light ranging from Mid-IR to hard UV with respect to the application, light-matter interaction, experiments using free space beams • Optical Time Domain Reflectometry (OTDR) and measurement of spectral attenuation of glass and polymer optical fibers • Fusion splicing and connectorization of glass fibers and characterization of fiberoptic components • Characterization of a fiberoptic transmission system employing an LED or laser diode source • Determination of bit error rate and dispersion parameters • Characterization of selected optical systems, e.g. an Erbium-Doped Fiberoptic Amplifier (EDFA) with a DFB laser source and an Optical Spectrum Analyzer (OSA)			

4	**Teaching Methods**
	Laboratory in small groups
5	**Content-Related Module Prerequisites Module Prerequisites**
	Basic knowledge of the subjects of the first five semesters
6	**Formal Module Prerequisites**
	None
7	**Type of Exams**
	Graded reports about the individual projects yield the total grade for this module
8	**Prerequisite for the Granting of Credits**
	Passed Exam (All reports graded at least 4.0)
9	**This Module Appears in:**
	Elektrotechnik_BPO2014_BPO2015_BPO2019 Mechatronics_BPO2013_BPO2019
10	**Weighting of Grade in Relationship to Final Grade**
	Weighting equals the proportion of module credits in relationship to the total number of grade-relevant credits
11	**Additional Information / Literature**
	Literature will be announced project-specific every semester.