

EITM130I Optical Data Transmission

Studiengang	Elektro- und Informationstechnik (Master)
Modulname	EITM130I Optical Data Transmission
Zugeordnete Lehrveranstaltungen	EITM131I Lecture Optical Data Transmission EITM132I Lab Optical Data Transmission
Studiensemester	1st Semester
Modulverantwortlicher	Prof. Dr. Ulrich Grünhaupt
Dozenten	Prof. Dr. Ulrich Grünhaupt
Sprache	English or German; the course language will be announced at the beginning of the semester
Lehrform, SWS und Gruppengröße	Course, lecture 2h/week, lab 2h/week with groups of 2 students
Modus	Mandatory in the study field Information technology, elective in the other study fields of the program
Turnus	Winter semester
Arbeitsaufwand	On-campus program 60 h, self study 90 h
Kreditpunkte	5 CP
Empfohlene Vorkenntnisse	Communication Theory, Optics, Solid State Physics
Voraussetzungen nach Prüfungsordnung	none
Lernziele / Kompetenzen	<p><i>Allgemein:</i> The module imparts knowledge of optoelectronics, communications and solid state physics. Optoelectronic components and their relevant features are discussed and based on that the realization of state of the art optical data transmission systems with an analysis of their characteristic problems and potentials follows.</p> <p><i>Zusammenhänge / Abgrenzung zu anderen Modulen:</i> Optical data transmission requires a comprehensive background in communications, signal theory and solid state physics which is provided by corresponding modules of this master's program. However, the module Communication Systems of this master's program is complemented by this module and the practical experience in optical data transmission systems and components which the students gain during their lab projects.</p> <p><i>Kenntnisse, Fertigkeiten, Kompetenzen:</i> Upon successful completion,</p> <ul style="list-style-type: none"> • the students know the most important components of optical data transmission systems • the students are able to design optical data transmission systems for various fields of application • the students can calculate the theoretical behavior of optical data transmission systems • the students know how to measure all relevant parameters of optical data transmission systems • the students are able to optimize optical communication links regarding optimum performance and cost
Inhalt	<ul style="list-style-type: none"> • Optical Fiber Basics • Optical Emitters, modulators, detectors and amplifiers (EDFA) • Fiber Optic Measurement Techniques • WDM technology and coherent transmission • Noise, dispersion penalty and bit error rate in optical links

	<ul style="list-style-type: none"> • Nonlinearities and impairments in fiber systems
Studien- und Prüfungsleistungen	Assessment is done by either a written exam (90 minutes) or an oral examination (20 minutes). The form of examination will be announced at the beginning of the semester.
Medienformen	<ul style="list-style-type: none"> • course manuscript • slides (Powerpoint, PDF) • simulation programs • exercises
Literatur	<p>course manuscript</p> <p>Brückner, Volkmar: <i>Elemente optischer Netze: Grundlagen und Praxis der optischen Datenübertragung</i>, Vieweg+Teubner, 2011</p> <p>Reider, G. A.: <i>Photonik</i>, Springer, 2013</p> <p>Keiser, Gerd: <i>Optical Fiber Communications</i>, McGraw Hill, 2010</p> <p>Agrawal, Govind P.: <i>Fiber-Optic Communication Systems</i>, John Wiley, 2010</p> <p>Kaminow, Ivan P.; Li, Tingye; Willner, Alan E.: <i>Optical Fiber Telecommunications V1b: Systems and Networks (Optics and Photonics)</i>, Academic Press, 2013</p>