
Modulbezeichnung: **Linear and non-linear fibre optics (LinNLFO)** **5 ECTS**
 (Linear and non-linear fibre optics)

Modulverantwortliche/r: Bernhard Schmauss
 Lehrende: Bernhard Schmauss, Meinert Jordan

Startsemester: SS 2021	Dauer: 1 Semester	Turnus: jährlich (SS)
Präsenzzeit: 60 Std.	Eigenstudium: 90 Std.	Sprache: Englisch

Lehrveranstaltungen:

Linear and non-linear fibre optics (SS 2021, Vorlesung, 2 SWS, Bernhard Schmauss)
 Linear and non-linear fibre optics: Exercise (SS 2021, Übung, 2 SWS, Lisa Härteis)

Empfohlene Voraussetzungen:

Recommended prior knowledge:

- Semiconductor physics
- Ray optics
- Photonics

Inhalt:

Optical data transmission systems are the enabler for our modern communication networks. Since the first systems have been installed, the transmission capacity as well as the transmission distance has been increased dramatically. The migration from point-to-point transmission systems to complex optical networks is still in progress. The fast evolution of optical transmission technology is stimulated by innovations in the field of the system key components. The lectures concentrate on the physical effects and properties of key components like semiconductor lasers, optical modulators, optical fibers, optical amplifiers and detector diodes. Especially also the nonlinear effects of the transmission fiber are discussed. The main focus is on the effects and characteristics which are important to achieve a certain system performance. The influence of component parameters on system performance is presented in examples related to installed systems and systems that are actually in development. The exercises partly use a numerical simulation tool to analyze the component influence on system performance.

Lernziele und Kompetenzen:

Students

- Understand structure and operation of components of optical communication systems
- Rate the optical properties of components and evaluate the influence of operational parameters on system performance
- Are able to analyze the influence of linear and nonlinear fiber effects on optical signals and system performance
- Can make use of system simulation tools to engineer optical links

Literatur:

Agrawal, G.P.: Fiber Optic Communication Systems, Willey, New York, 1992
 Kaminow, I, Li, T.: Optical Fiber Telecommunications IVA, Academic Press, 2002
 Kaminow, I, Li, T., Willner, A.: Optical Fiber Telecommunications VA, Academic Press, 2008

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

[1] Advanced Optical Technologies (Master of Science)

(Po-Vers. 2018w | TechFak | Advanced Optical Technologies (Master of Science) | Gesamtkonto | Major Topics | Optics in Communication and IT | Linear and non-linear fibre optics)

[2] Advanced Signal Processing & Communications Engineering (Master of Science)

(Po-Vers. 2016w | TechFak | Advanced Signal Processing & Communications Engineering (Master of Science) | Gesamtkonto | Wahlmodule | Technical Electives | Linear and non-linear fibre optics)

[3] Advanced Signal Processing & Communications Engineering (Master of Science)

(Po-Vers. 2020w | TechFak | Advanced Signal Processing & Communications Engineering (Master of Science) | Gesamtkonto | Technical Electives | Linear and non-linear fibre optics)

- [4] **Communications and Multimedia Engineering (Master of Science)**
(Po-Vers. 2011 | TechFak | Communications and Multimedia Engineering (Master of Science) | Gesamtkonto | Wahlpflichtmodule | Technische Wahlpflichtmodule | Linear and non-linear fibre optics)
- [5] **Communications and Multimedia Engineering (Master of Science)**
(Po-Vers. 2011 | TechFak | Communications and Multimedia Engineering (Master of Science) | Gesamtkonto | Wahlmodule | Technische Wahlmodule | Linear and non-linear fibre optics)
- [6] **Computational Engineering (Master of Science)**
(Po-Vers. 2016w | TechFak | Computational Engineering (Master of Science) | Gesamtkonto | Wahlpflichtbereich Technisches Anwendungsfach | Computational Optics | Linear and non-linear fibre optics)
- [7] **Computational Engineering (Rechnergestütztes Ingenieurwesen) (Master of Science)**
(Po-Vers. 2013 | TechFak | Computational Engineering (Rechnergestütztes Ingenieurwesen) (Master of Science) | Gesamtkonto | Wahlpflichtbereich Technisches Anwendungsfach | Computational Optics | Linear and non-linear fibre optics)
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Studien-/Prüfungsleistungen:

Linear and non-linear fibre optics (Prüfungsnummer: 267499)

(englische Bezeichnung: Linear and non-linear fibre optics)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 90

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

According to the regulations concerning deviations from degree programme and examination regulations digital online examinations via ZOOM (30 minutes) have been defined as an alternative form for examinations.

Gemäß Corona-Satzung wird als alternative Prüfungsform festgelegt: digitale Fernprüfung von 30 Minuten Dauer mittels ZOOM.

Duration: 90 min for a written exam, or 30 min for an oral exam, depending on the number of candidates.

Erstabelleung: SS 2021, 1. Wdh.: WS 2021/2022

1. Prüfer: Bernhard Schmauss
