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**Modulbezeichnung:** **Laser Technology (LT)** **5 ECTS**  
(Laser Technology)

Modulverantwortliche/r: Kristian Cvecek

Lehrende: Clemens Roider, Kristian Cvecek

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Startsemester: WS 2021/2022

Dauer: 1 Semester

Turnus: jährlich (WS)

Präsenzzeit: 60 Std.

Eigenstudium: 90 Std.

Sprache: Englisch

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**Lehrveranstaltungen:**

Laser Technology (WS 2021/2022, Vorlesung, 4 SWS, Kristian Cvecek et al.)

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**Inhalt:**

- Physical phenomena applicable in Laser Technology: EM waves, Beam Propagation, Beam Interaction with matter
- Fundamentals of Laser Technology: Principals of laser radiation, types and theoretical understanding of various types of lasers
- Laser Safety and common applications: Metrology, Laser cutting, Laser welding, Surface treatment, Additive Manufacturing
- Introduction to ultra-fast laser technologies
- Numerical exercises related to above mentioned topics
- Demonstration of laser applications at Institute of Photonic Technologies (LPT) and Bavarian Laser Centre (blz GmbH)
- Possible Industrial visit (e.g. Trumpf GmbH, Stuttgart)
- Optional: invited lecture about a novel laser application

**Lernziele und Kompetenzen:**

The student. . .

- would know the fundamental principles involved in the development of lasers.
- will understand the design and functionality of various types of lasers, and be able to comprehend laser specifications.
- will be able to design and analyse a free space laser beam propagation setup.
- will gain knowledge about basic optical components used in laser setups such lenses, mirrors, polarizers, etc.
- would be able to understand the basic interaction phenomena during laser-matter interaction processes.
- would be able to determine the advantages and disadvantages of using laser process for industrial applications.
- will know and be able to apply the safety principles while handling laser setups.
- will be familiar with several most common industrial application of laser for material processing such as cutting, welding, material ablation, additive manufacturing.
- will be familiar with metrological applications of lasers.
- will become familiar with and be able to use international (English) professional terminology.

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**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 | Optical Material Processing | Lasertechnik / Laser Technology)

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**Studien-/Prüfungsleistungen:**

Laser Technology (Prüfungsnummer: 71501)

(englische Bezeichnung: Laser Technology)

Prüfungsleistung, Klausur, Dauer (in Minuten): 120

Anteil an der Berechnung der Modulnote: 100% Prüfungssprache: Englisch

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

1. Prüfer: Kristian Cvecek, 2. Prüfer: Michael Schmidt

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