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**Modulbezeichnung:** Convex Optimization in Communications and Signal Processing (ConvOpt) **5 ECTS**  
 (Convex Optimization in Communications and Signal Processing)

Modulverantwortliche/r: Wolfgang Gerstacker  
 Lehrende: Wolfgang Gerstacker

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Startsemester: WS 2020/2021	Dauer: 1 Semester	Turnus: jährlich (WS)
Präsenzzeit: 60 Std.	Eigenstudium: 90 Std.	Sprache: Englisch

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**Lehrveranstaltungen:**

Convex Optimization in Communications and Signal Processing (WS 2020/2021, Vorlesung, 3 SWS, Wolfgang Gerstacker)  
 Tutorial for Convex Optimization in Communications and Signal Processing (WS 2020/2021, Übung, 1 SWS, Adela Vagollari)

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**Empfohlene Voraussetzungen:**

Signals and Systems, Communications

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**Inhalt:**

Convex optimization problems are a special class of mathematical problems which arise in a variety of practical applications. In this course we focus on the theory of convex optimization, corresponding algorithms, and applications in communications and signal processing (e.g. statistical estimation, allocation of resources in communications networks, and filter design). Special attention is paid to recognizing and formulating convex optimization problems and their efficient solution. The course is based on the textbook "Convex Optimization" by Boyd and Vandenberghe and includes a tutorial in which many examples and exercises are discussed.

**Lernziele und Kompetenzen:**

Students

- characterize convex sets and functions,
- recognize, describe and classify convex optimization problems,
- determine the solution of convex optimization problems via the dual function and the KKT conditions,
- apply numerical algorithms in order to solve convex optimization problems,
- apply methods of convex optimization to different problems in communications and signal processing

**Literatur:**

Boyd, Steven ; Vandenberghe, Lieven: Convex Optimization. Cambridge, UK : Cambridge University Press, 2004

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**Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:**

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

[1] **Medizintechnik (Master of Science)**

(Po-Vers. 2019w | TechFak | Medizintechnik (Master of Science) | Modulgruppen spezifisch nach Studienrichtungen | Studienrichtung Medizinische Bild- und Datenverarbeitung | M5 Medizintechnische Vertiefungsmodule (BDV) | Convex Optimization in Communications and Signal Processing)

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**Studien-/Prüfungsleistungen:**

Convex Optimization in Communications and Signal Processing (Prüfungsnummer: 68501)  
 (englische Bezeichnung: Convex Optimization in Communications and Signal Processing)

Prüfungsleistung, Klausur, Dauer (in Minuten): 90  
 Anteil an der Berechnung der Modulnote: 100%

Erstablingung: WS 2020/2021, 1. Wdh.: SS 2021  
 1. Prüfer: Wolfgang Gerstacker

