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**Modulbezeichnung:** **Transmission System Operations and Control (TSOC)** **5 ECTS**  
 (Transmission System Operations and Control)

Modulverantwortliche/r: Matthias Luther  
 Lehrende: Matthias Luther

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

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**Lehrveranstaltungen:**

Transmission System Operations and Control (SS 2021, Vorlesung, 4 SWS, Matthias Luther)  
 Übungen zu Transmission System Operations and Control (SS 2021, Übung, Assistenten)

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**Es wird empfohlen, folgende Module zu absolvieren, bevor dieses Modul belegt wird:**

Betriebsverhalten elektrischer Energiesysteme  
 Betriebsmittel und Komponenten elektrischer Energiesysteme

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**Inhalt:**

The lecture gives an overview on the transmission system operations and how to control the system in the growing challenges and changing environment, like continuous development of electricity market, extensive cross-border electricity exchange throughout the continent and rapid growth of generation from intermittent Renewable Energy Sources (RES). This requires a need for close cooperation of the European Transmission System Operators as well as the development and implementation of new tools for system operation including a joint platform of harmonized technical rules. The lecture comprises technical and organizational aspects for interconnected operation including load and frequency control, voltage and reactive power control, load-flow management. Stability issues are investigated based on the analysis of major blackouts. It is explained why and how the electricity market has been implemented. The lecture is given in English since growing cooperation among TSOs and other parties in the electricity sector requires a common technical terminology and communication language.

**Lernziele und Kompetenzen:**

The students

- learn the basic relationships in transmission system control,
- understand the advantages of interconnected operation,
- understand the interplay between grid equipment,
- understand the functionality of frequency and voltage control in interconnected systems,
- analyse the provision of ancillary services to guarantee a stable and secure operation of interconnected systems,
- apply calculation methodologies to practical examples,
- analyse current challenges in transmission system control due to the integration of renewables and
- analyse the control practises of ancillary service providers to guarantee a stable transmission system operation.

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

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

**[1] Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science)**

(Po-Vers. 2019w | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science) | Gesamtkonto | Studienrichtung Elektrische Energie- und Antriebstechnik | Kern- und Vertiefungsmodule Elektrische Energie- und Antriebstechnik | Vertiefungsmodule Elektrische Energie- und Antriebstechnik | Transmission System Operation and Control)

**[2] Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science)**

(Po-Vers. 2019w | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science) | Gesamtkonto | Studienrichtung Leistungselektronik | Kern- und Vertiefungsmodule Leistungselektronik | Vertiefungsmodule Leistungselektronik | Transmission System Operation and Control)

Dieses Modul ist daneben auch in den Studienfächern "Artificial Intelligence (Master of Science)", "Berufspädagogik Technik (Bachelor of Science)", "Berufspädagogik Technik (Master of Education)", "Elektrotechnik,

Elektronik und Informationstechnik (Master of Science)", "Energietechnik (Master of Science)", "Informatik (Master of Science)", "Wirtschaftsingenieurwesen (Bachelor of Science)", "Wirtschaftsingenieurwesen (Master of Science)" verwendbar.

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**Studien-/Prüfungsleistungen:**

Transmission System Operation and Control (Prüfungsnummer: 60621)

(englische Bezeichnung: Transmission System Operation and Control)

Prüfungsleistung, Klausur, Dauer (in Minuten): 90

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

Erstablingung: SS 2021, 1. Wdh.: WS 2021/2022 (nur für Wiederholer)

1. Prüfer: Matthias Luther

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