Modulbezeichnung:	**Praktikum Transmission System Operations and Control (PR-TSOC)** (Practice Transmission System Operations and Control)	**2.5 ECTS**
Modulverantwortliche/r:	Matthias Luther	
Lehrende:	Matthias Luther	

Startsemester: WS 2022/2023	Dauer: 1 semester	Turnus: jährlich (WS)
Präsenzzeit: 45 Std.	Eigenstudium: 30 Std.	Sprache: Deutsch und Englisch

Lehrveranstaltungen:

Für alle Phasen des Praktikums gilt Anwesenheitspflicht zum Bestehen der Prüfungsleistung.

Praktikum Transmission System Operations and Control (WS 2022/2023, Praktikum, Matthias Luther et al.)

Empfohlene Voraussetzungen:

Due to the external venue, the number of participants in this exclusive internship is very limited. In order to guarantee the learning success the corresponding lecture is strictly recommended. If the number of applicants exceeds the number of places available, a decision will be made based on the lecture grades.

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

Transmission System Operations and Control

Inhalt:

The practical training gives the students the opportunity to get to know the operative business of a TSO. The learning objective is to deepen the contents of the lectures as well as to put them into practice. To this end, students will carry out practical training in cooperation with the TSO - Swissgrid and its transmission system or control room environment. This direct link between theory and practice gives students a comprehensive insight into the state of the art. The work practice will therefore take place on site at Swissgrid.

In the context of Europe's security of supply, Swissgrid plays a very important role as a transit country and coordination centre for Southern Europe. This interanationalism and the associated routines of daily business is an aspect that the students should get to know during their internship.

Students should learn and recognize how the physical laws of a complex European energy system can be embedded in an operational control room environment through mathematical representation. To this end, the following points are discussed and worked through in groups or individually in connection with Swissgrid:

- The load-frequency control complex process from dimensioning of operational reserves until SCADA/EMS systems functionalities.
- Implementation of the theory of reactive power / voltage control.
- Integration of WAM (PMU-based) system measurements philosophy in the system operation.
- Investigation of the related processes:
- Long term operational planning process includes the planning of outages and set up the reference model of Swiss transmission system.
- In the short term operational planning process the Continental European network model is being merged and checked.
- In case of discovered contingencies the remedial actions are proposed and implemented
- State estimation calculations in the real-time operation including operational security analysis, real-time congestion management and remedial actions.
- Data and information exchange internally and among TSOs in Europe.

Lernziele und Kompetenzen:

- Under guidance, gain initial insights and knowledge of the operational processes of TSOs.
- Practice-oriented introduction to the future problems of power engineering.
- Transformation of the physical phenomena in the control automatics and the actions
- Investigation and interpretation of the numerical results with the help of their engineering knowledge

- Gain experience in dealing with the complexity of transmission system operation
- Development of methodological competence for the processing and provision of complex energy technology topics

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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 (Master of Science)**
(Po-Vers. 2015s | TechFak | Elektrotechnik, Elektronik und Informationstechnik (Master of Science) | Gesamtkonto | Studienrichtung Elektrische Energie- und Antriebstechnik | Hauptseminar und Laborpraktikum Elektrische Energie- und Antriebstechnik | Transmission System Operations and Control)

Dieses Modul ist daneben auch in den Studienfächern "Elektrotechnik, Elektronik und Informationstechnik (Bachelor of Science)", "Mechatronik (Master of Science)", "Wirtschaftsingenieurwesen (Bachelor of Science)", "Wirtschaftsingenieurwesen (Master of Science)" verwendbar.

Studien-/Prüfungsleistungen:

Transmission System Operations and Control (Prüfungsnummer: 65311)
(englische Bezeichnung: Transmission System Operations and Control)

Prüfungsleistung, Praktikumsleistung
Anteil an der Berechnung der Modulnote: 100%
weitere Erläuterungen:
Die Prüfungsleistung setzt sich zusammen aus der Vor- und Nachbereitung sowie der Durchführung des Praktikums. Während der Vor- und Nachbereitung sind praktikumsbezogene Themenstellungen zu einem Termin vor bzw. nach der Durchführung auszuarbeiten und sowohl schriftlich (maximal 15 Seiten) zu dokumentieren als auch zu präsentieren (ca. 15-20 Minuten). Für alle Phasen des Praktikums gilt Anwesenheitspflicht zum Bestehen der Prüfungsleistung.

Erstablegung: WS 2022/2023, 1. Wdh.: keine Angabe
1. Prüfer: Matthias Luther
