Modulbezeichnung:	**Transmission Electron Microscopy in Material Science II (IMN_M10/11-MWT/NT_TEMII)** (Transmission Electron Microscopy in Material Science II)	**5 ECTS**
Modulverantwortliche/r:	Erdmann Spiecker	
Lehrende:	Mingjian Wu, Benjamin Apeleo-Zubiri, Johannes Will, Erdmann Spiecker, Stefanie Rechberger	

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

Lehrveranstaltungen:

Transmissionselektronenmikroskopie in Materialforschung und Nanotechnologie 2 (SS 2021, Vorlesung, 2 SWS, Erdmann Spiecker et al.)
Übungen zur Transmissionselektronenmikroskopie 2 (SS 2021, Übung, 2 SWS, Mingjian Wu et al.)

Inhalt:

The module deals with the fundamentals of micro- and nanostructure research with the focus on today's state-of-the art capabilities of transmission electron microscopy in the investigation of materials down to the atomic scale. The module is the continuation of module "Transmission Electron Microscopy in Material Science I" and comprises the introduction and application to current research topics of advanced TEM techniques, including imaging (HRTEM, STEM), spectroscopic (EDXS, EELS, EFTEM) and 3D (ET) techniques. The aim is always to give insight into both the contrast mechanisms and physics of as well as the achievable information delivered by the different techniques. This module can only be chosen as "Wahlmodul" and not in combination with "Kernfachmodule WW9" ("Fundamentals of Micro- and Nanostructure Research" & "Applied Micro- and Nanostructure Research").

Lernziele und Kompetenzen:

Die Studierenden

Fachkompetenz

Wissen

- Knowledge about the application of high resolution techniques for nanomaterials

Verstehen

- In-depth understanding of microscopy techniques for micro- and nanostructure research
- In-depth understanding of basic and advanced imaging, diffraction and spectroscopic TEM techniques and their application to material science
- Insight into the structure property relationship of materials

Anwenden

- Hands-on-training on modern analysis software for EM applications
- Hands-on-training and experience on transmission electron microscopes accompanied with suitable exercises (3 days of practical exercise during the lecture period)

Literatur:

- Goodhews, Humphreys and Beanland: Electron Microscopy and Analysis
- Williams & Carter: Transmission Electron Microscopy
- Reimer & Kohl: Transmission Electron Microscopy
- Fultz & Howe: Transmission Electron Microscopy and Diffractometry of Materials
- Reimer: Transmission Electron Microscopy
- P. Haasen: Physikalische Metallkunde
- G. Gottstein: Physikalische Grundlagen der Materialkunde
- J. M. Cowley: Diffraction Physics
- Lecture notes.

Studien-/Prüfungsleistungen:

Transmission Electron Microscopy in Material Science II (Prüfungsnummer: 62871)
(englische Bezeichnung: Transmission Electron Microscopy in Material Science II)

Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 15
Anteil an der Berechnung der Modulnote: 100%
weitere Erläuterungen:
Prüfungssprache nach Wahl der Studierenden
Prüfungssprache: Deutsch oder Englisch

Erstablegung: SS 2021, 1. Wdh.: WS 2021/2022
1. Prüfer: Erdmann Spiecker
