Modulbezeichnung:	**Materials and Structure (MS)** (Materials and Structure)	**5 ECTS**
Modulverantwortliche/r:	Erdmann Spiecker, Johannes Will	
Lehrende:	Erdmann Spiecker	

Startsemester: WS 2021/2022	Dauer: 1 Semester	Turnus: jährlich (WS)
Präsenzzeit: 30 Std.	Eigenstudium: 120 Std.	Sprache: Englisch

Lehrveranstaltungen:

Materials and Structure (Werkstoffe und ihre Struktur) (WS 2021/2022, Vorlesung, 2 SWS, Johannes Will et al.)

Inhalt:

The content of the module gives an overview of different fields of materials science and engineering. The following topics are included in the module:

- atomic structure and interatomic bonding
- structure of crystalline solids
- structure determination by X-ray diffraction
- imperfections in solids
- microscopic characterization of crystal defects
- mechanical properties of metals
- dislocations and strengthening mechanisms
- phase diagrams of binary alloys
- phase diagrams of metals: development of microstructure
- kinetics of phase transformations
- structure and properties of ceramics

Lernziele und Kompetenzen:

The course enables the students

- to classify the different types of bonding that occur in materials
- to understand the relationship between bonding, structure and fundamental materials properties
- to describe crystalline materials with basic concepts of crystallography
- to classify crystal defects with respect to their dimensionality
- to describe the importance of dislocations and interfaces for the mechanical properties of metals
- to understand the development of microstructure based on phase diagrams and the kinetics of phase transformation
- to describe basic crystal structures of ceramics

The course forms the basis for advanced lectures in the field of materials science.

Literatur:

- William D. Callister, Jr., "Materials Science and Engineering: An Introduction", John Wiley & Sons, Inc., 7th edition (or later)

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

[1] **Advanced Materials and Processes (Master of Science)**
(Po-Vers. 2019w | TechFak | Advanced Materials and Processes (Master of Science) | Gesamtkonto | Grundlagenfächer | Materials and Structure)

Studien-/Prüfungsleistungen:

Materials and Structure (Prüfungsnummer: 1731)
(englische Bezeichnung: Materials and Structure)
Studienleistung, Klausur, Dauer (in Minuten): 90
weitere Erläuterungen:
According to the Corona Statutes, the alternative form of examination is an oral examination lasting 30 minutes or a term paper

Prüfungssprache: Englisch

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