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**Modulbezeichnung: Materials and Structure (MS)** **5 ECTS**  
(Materials and Structure)

Modulverantwortliche/r: Erdmann Spiecker, Johannes Will  
Lehrende: Erdmann Spiecker

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Startsemester: WS 2022/2023	Dauer: 1 Semester	Turnus: jährlich (WS)
Präsenzzeit: 30 Std.	Eigenstudium: 120 Std.	Sprache: Englisch

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**Lehrveranstaltungen:**

Materials and Structure (Werkstoffe und ihre Struktur) (WS 2022/2023, Vorlesung, 2 SWS, Johannes Will et al.)

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**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)

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**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)

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**Studien-/Prüfungsleistungen:**

Materials and Structure (Prüfungsnummer: 1731)

(englische Bezeichnung: Materials and Structure)

Studienleistung, Klausur, Dauer (in Minuten): 90 Prüfungssprache: Englisch

Erstablingung: WS 2022/2023, 1. Wdh.: SS 2023

1. Prüfer: Erdmann Spiecker

