

Materials Science (E066160)

Course size (nominal values; actual values may depend on programme)

Credits 3.0 Study time 90 h Contact hrs 30.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 2) Dutch lecture 30.0 h

Lecturers in academic year 2020-2021

Verleysen, Patricia TW08 lecturer-in-charge
Kersemans, Mathias TW11 co-lecturer

Offered in the following programmes in 2020-2021

	crdts	offering
Bachelor of Science in Engineering: Architecture	3	A
Preparatory Course Master of Science in Engineering: Architecture (main subject Architectural Design and Construction Techniques)	3	A
Preparatory Course Master of Science in Engineering: Architecture (main subject Urban Design and Architecture)	3	A

Teaching languages

Dutch

Keywords

materials, materials microstructure, materials properties, materials selection, metals, polymers, composites, ceramics, glass, wood

Position of the course

The Materialen course deals with the structure of materials and related properties needed to use the materials. Widely used materials from the metal, polymer, composite and ceramic groups are discussed. The course also aims at acquiring insight into the materials selection process.

Contents

- Introduction: material groups and materials selection
- Basic principles of chemistry and mechanical materials behaviour
- Polymers: comparison with metals, origin of macromolecules, molecule structure and its influence on the properties, thermoset and thermoplastic polymers, processing
- Composites: structure of composite materials and laminates, fibre length, predictability of mechanical behaviour, materials used for the fibres and matrix, production techniques, design and analysis of composite structures
- Technical ceramics: structure and properties, applications, production techniques
- Wood: structure, behaviour and properties of wood and wood products
- Glass: definition and structure, deglassing, composition, properties
- Metals: structure, mechanical properties and corrosion

Initial competences

Final competences

- 1 **INSIGHT:** Insight into the relation between composition and structure of a material on the one hand and the properties of materials on the other. Insight into the limitations originating from the production process used to produce the structure or structural parts from a certain material.
- 2 **SKILLS:** Have the capacity to select a material or material class on the base of primary and secondary requirements posed to the material. Assess the problems that might arise if certain materials or production processes are used.
- 3 **ATTITUDES:** the materials selection process is based on much more than solely the mechanical properties of the material, also the production process of the structure or

structural part should be considered.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture

Learning materials and price

Dutch syllabus, distributed by student organisation VTK
costs appr. 8EUR

References

- W. D. Callister: Fundamentals of Materials Science and Engineering

Course content-related study coaching

Evaluation methods

end-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

During examination period: written closed-book exam.

Calculation of the examination mark