MSE-403 **Materials science**

Klok-Lermann Eva

Cursus	Sem.	Type
Bioengineering	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

The student will acquire an understanding of the basic concepts of materials in general and a deeper knowledge in metallic and nonmetallic inorganic materials and in polymers

Content

1. Atomic structure and bonding in solids 2. Metals and their alloys and ceramics - Structures and derived properties- Characterization- Phase diagrams- Defects in solids and resulting properties 3. Polymers- Macromolecular dispersity and characteristics- Basic polymerization mechanisms- Structures in dilute solution and solid state - Characterization 4. Mechanical properties of polymers, metals and alloys, ceramics

Keywords

Atomic structure and bonding
Phase diagrams
Polymers
Metals

Learning Prerequisites

Recommended courses

Organic Chemistry, bio-oriented Chemistry

Learning Outcomes

By the end of the course, the student must be able to:

- Discuss the basic concepts of the structure and organization of materials
- Compare the differencen in structure and properties of different classes of materials
- Sketch the prepration and processing, structure and properties of polymers, metals and ceramics

Transversal skills

- Use a work methodology appropriate to the task.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods

Lectures with exercises

Assessment methods

written exam

Resources

Bibliography

polycopies
- W.D. Callister Jr., D.G. Rethwisch, Fundamentals of Materials Science and Engineering, third edition, John Wiley & Sons.- G. Odian, Principles of Polymerization, 4th edition, Wiley-Interscience 2004.
- P.C. Hiemenz, T.P. Lodge, Polymer Chemistry, 2nd edition, CRC Press 2007.

Ressources en bibliothèque

- Principles of Polymerization / Odian
- Fundamentals of Materials Science and Engineering
- Polymer Chemistry / Hiemenz