

MSE-471

Biomaterials (pour MX)

Bastings Maartje

Cursus	Sem.	Type
Materials Science and Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	Written
Workload	60h
Weeks	14
Hours	2 weekly
Courses	2 weekly
Number of positions	

Summary

The course introduces the main classes of biomaterials used in the medical field. The interactions with biological environment and the properties of implants are presented with examples in orthopaedics, dentistry and ocular fields. Introduction to regulatory aspects.

Content

Introduction : definition of biomaterials and biological environment.
 Interactions with biological environment : biocompatibility, cytotoxicity, degradation, wear and corrosion.
 Main classes of biomaterials and their properties (metals, polymers and ceramics/cements).
 Orthopaedic implants : bone physiology and implants.
 Dental implants : tooth physiology and implants.
 Ocular implants : physiology and implants.
 Stage of development of biomaterials.
 Sterilization techniques.
 Introduction to regulatory aspects.

Keywords

Biomaterials, biocompatibility, biofonctionality, implants.

Learning Prerequisites**Required courses**

Introduction to materials science

Recommended courses

Materials, metallurgy, polymer, ceramics.

Learning Outcomes

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

- Estimate a biomaterial in function of the application
- Compare developments of new biomaterials
- Describe the interactions with biological environment
- Describe the developement process and regulatory aspects

Transversal skills

- Use a work methodology appropriate to the task.
- Communicate effectively with professionals from other disciplines.
- Respect relevant legal guidelines and ethical codes for the profession.
- Collect data.
- Access and evaluate appropriate sources of information.

Teaching methods

Ex cathedra and invited speakers

Expected student activities

Attendance at lectures.

Search for information to prepare course.

Assessment methods

Written exam

Supervision

Office hours	Yes
Assistants	No
Forum	No

Resources

Ressources en bibliothèque

- [Biological performance of materials : fundamentals of biocompatibility / Black](#)
- [Traité des matériaux 7 - Comportement des matériaux dans les milieux biologiques / Schmidt](#)
- [Biomaterials science : an introduction to materials in medicine / Ratner](#)
- [Bone Repair Biomaterials / Planell](#)
- [Human Anatomy & Physiology: Pearson New International Edition / Marieb](#)