BIOENG-458 **Next-generation biomaterials**

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Cursus	Sem.	Type
Biotechnology minor	E	Opt.
Life Sciences Engineering	MA2, MA4	Obl.
Minor in life sciences engineering	E	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

"Next-Generation Biomaterials" explores the latest advancements in the development and application of cutting-edge biomaterials for medical and healthcare innovation.

Content

Building on foundational knowledge, this course introduces students to a new era of smart and multifunctional materials designed to address current and future challenges in human health.
Topics will include nanobiomaterials, immunomodulatory materials, materials for gene therapy, tissue engineering and organoids, living biomaterials.

Keywords

biomaterials, bioengineering, material engineering, drug delivery, tissue engineering, immune modulation, neuroscience, synthetic biology.

Learning Prerequisites

Required courses

This class requires a basic knowledge in biology, physics, chemistry, and material science.

Learning Outcomes

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

- Describe the concept of biomaterials
- Make example of how engineering approaches has led to advancements in biomaterials
- Take into consideration how to apply material engineering principles to biomedical research
- Assess / Evaluate how to apply engineering principles to biology
- Analyze of how material engineering approaches has led to advancements in healthcare applications
- Describe the discovery or development of new biomaterials from recent scientific literatures

Transversal skills

- Write a scientific or technical report.
- Communicate effectively with professionals from other disciplines.
- Communicate effectively, being understood, including across different languages and cultures.

Assessment methods

Group project: 40%
Final written exam: 60%

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Moodle Link

- https://go.epfl.ch/BIOENG-458