BIOENG-449

Tissue engineering

Lütolf Matthias, Tang Li

Cursus	Sem.	Type
Bioengineering	MA4	Opt.
Life Sciences Engineering	MA2, MA4	Opt.

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

Summary

Tissue engineering is an interdisciplinary field that broadly impacts human health. This course provides students an overview of how engineering approaches can be used to investigate and manipulate cell and tissue functions and enable students to be on the cutting edge of tissue engineering.

Content

Part A. The biological fundamentals
Fundamentals in tissue organization and morphogenesis
Stem cells and adult tissue dynamics
Model systems in tissue engineering

Part B. The engineering fundamentals
Macro-materials for tissue engineering
Micro-/nano-materials for tissue engineering

Part C. Specific topics
Synthetic morphogenesis
Immune tissue engineering
Soft tissue engineering
Tissue engineering bone
Tissue engineering in urology
Neural tissue engineering

Part D
Presentations of group projects I
Presentations of group projects II

Keywords

tissue engineering, regenerative medicine, stem cell, materials engineering, drug delivery

Learning Prerequisites

Required courses

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

Recommended courses

BIOEING-399 Immunoengineering
BIOENG-315 Materials science for bioengineers
BIOENG-442 Biomaterials

Teaching methods

Lectures integrated with exercises (group project and presentation)

Expected student activities

Attending lectures, completing exercises, team project, reading and presenting literature.

Assessment methods

Group project: 40%
Final written exam: 60%

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Moodle Link

- https://moodle.epfl.ch/course/view.php?id=14448