FJQ3110 Microphysiological Systems 6.0 credits

Mikrofysiologiska system

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for FJQ3110 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Recommendation:

The course content is tuned for M.Sc. and PhD students in the field of bioengineering and bioelectrical engineering but can be relevant for M.Sc. and PhD students in material science, biotechnology, cell physics, biology and similar study directions.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completing the course, the student should be able to:

• Reflect over the need for and limitations of systems mimicking and predicting human physiology

• Understand the critical components of biomimetic systems

• Understand the basic principles in microfluidics and be able to describe material options and fabrication processes

• Understand the differences in vitro models including Organ Chips, Organoid cultures, other 3D cell cultures and conventional cell cultures.

• Analyze the needs for analytical readouts of biomimetic systems and understand different sensing principles that are compliable with the technologies

• Understand the basic principles in extrapolations of in vitro data to human in vivo physiology

• Analyse and reflect over the use of biomimetic systems in drug development and clinical settings

• Analyze and discuss the scientific literature in biomimetic systems

• Analyze and reflect over the sustainability aspects of Biomimetic systems, in particular the aspects of environmental and societal impact of both the current status of the studies and future dissemination of the technology

Course contents

The course is organized as lecture series, consisting of ~12 lectures combined with seminars where the student will present and discuss their project works. The lecture and seminar series will be shared between the universities as web conferences. The participants of the course will be divided in groups with at least two participants from each university. The groups will be given a topic for in depth studies of relevant scientific literature. This project work will be presented as a seminar and a written review. See also detailed syllabus below.

Examination

• EXA1 - Examination, 6.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

- A lecture 40%
- A review on the topic 40%
- A multiple-choice exam 20%

Other requirements for final grade

- 80% attendance in class
- Each student will have to prepare a lecture (as part of a group) – preferably mixed groups between the universities
- Each student will have to prepare a review on the topic he chooses (as part of a group) – preferably mixed groups between the universities
- All students are expected to be active participants during the meeting

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.