FSK3510 Cellular Biophysics I 8.0 credits

Den biologiska cellens fysik I

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

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

Establishment

Course syllabus for FSK3510 valid from Autumn 2014

Grading scale

Education cycle

Third cycle

Specific prerequisites

Enrolled PhD student.

Language of instruction

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

Intended learning outcomes

The main purpose of the course is to give the students practical tools to describe the transport properties of biological cells.
After the course the participants should be able to:

- understand which molecules can be transported across cellular membranes and which mechanisms are used for the transport
- choose the relevant mathematical models to describe the transport of water, ions and solutes within cells and through the cellular membranes
- predict how water and ion homeostasis of the cells, as well as the membrane potential, are affected by the cell microenvironment
- in their research projects, set up microscopy based measurements of biophysical parameters in living cells and analyze the real measurement data

Course contents

Transport within the cells and across the cell membranes. Transport of solutes and water, concurrent transport, carrier-mediated transport, transport of ions. Membrane potential. Cellular homeostasis. Measurement techniques for biophysical parameters.

Disposition

Lectures: 18 h
Laboratory exercises: 24 h
Seminar: 4 h

Course literature

Weiss T. F. Cellular Biophysics, volume 1, MIT Press, 1996

Examination

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.

The course is examined by a written exam (TEN1; 4.0 university credits, grading P/F), a hand-in assignment (INL1; 1.5 university credits, grading P/F), written lab reports (LAB1; 1.5 university credits, grading P/F) and a presentation at a seminar (SEM1; 1.0 university credits, grading P/F).

Other requirements for final grade

INL1 - hand-in assignment, 1.5 university credits, grading P/F.
LAB1 - laborations, 1.5 university credits, grading P/F.
SEM1 - seminar, 1.0 university credits, grading P/F.
TEN1 - written exam, 4.0 university credits, grading P/F.

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.