SK2510 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 SK2510 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Biotechnology,Engineering Physics,Physics

Specific prerequisites

Mathematics corresponding to B2, D2, E2, F2, M2, T2. Basic physics and thermodynamics.

Recommended previous knowledge:
SK2530 (Introduction to biomedicine for engineers) and SK2500 (Physics of Biomedical Microscopy) are recommended but not a prerequisite.

Language of instruction

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

Intended learning outcomes

After the course the student should be able to:

- describe the fundamental physical principles that define the function of cells
- define mathematical models describing the transport of water, ions and solutes in cells and over the cellular membranes
- describe how water and ion homeostasis is maintained and affected by the microenvironment
- calculate membrane potential in different cellular environments
- perform measurements of some cell-physical parameters in living cells using microscopy based measurement techniques.

Course contents

Membranes. Electrical and mechanical properties of cells. Active and passive transport of water, ions and metabolites. Measurement techniques for cell-physical parameters.

Course literature

Philip Nelson, Biological Physics (updated 1st ed. 2008), W.H.Freeman and co.

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.

Other requirements for final grade

Written 5h exam (TEN1: 5 credits, grading scale A/B/C/D/E/Fx/F).
Hand in assignments (INL1; 1 credit, grading scale P/F).
Laboratory (LAB1; 1 credit, grading scale 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.