SK2520 Experimental Methods in Molecular Biophysics 8.0 credits

Experimentella metoder inom molekylär biofysik

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 SK2520 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. Fundamental knowledge of Physics.

Recommended previous knowledge:
Fundamental knowledge in quantum mechanics and optics advantageous, but not absolutely required.

Language of instruction

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

Intended learning outcomes

This course covers different experimental biophysical methods, how they are used to study structures and dynamics of biomolecules and their interactions. It also gives an overview of how these biophysical techniques are used in practice in biotechnology, drug development and in fundamental academic research. After this course the students are expected to be able to:

- give a an overview of the main categories of biomolecules present in the human body, what their main functions are, and how they are built.
- explain how interactions can take place between biomolecules and electromagnetic radiation
- state what modern spectroscopic techniques that are used in molecular biophysics, and to explain the physical principles upon which these methods are based
- Based on knowledge of the physical principles of the different biophysical techniques, judge and motivate which method(s) that is most appropriate to be applied to a particular biomolecular investigation.
- Give an overview of how these methods are used in practice in biotechnology, drug development, clinical diagnostics and in fundamental academic research.

Course contents

Fundamental properties of biomolecules. Basic thermodynamics of biomolecules, biomolecular dynamics and interactions. The principles of the following methods: Infrared-, Fluorescence-, Nuclear Magnetic Resonance-, Electron Spin Resonance-, Circular Dichroism- and Raman-spectroscopy, Mass spectrometry, X-ray crystallography, Electron Microscopy, Surface Plasmon Resonance, Atomic Force Microscopy. An overview of applications of these techniques in fundamental academic research, in pharmaceutical and biotech industry, and for clinical diagnostics.

Lectures (34 h), laborations (8 h), study visit (6 h)

Course literature

Van Holde, K.E. et al, Principles of Physical Biochemistry, Prentice Hall

Scientific articles and hand-outs

Examination

- LAB1 - Laboratory Work, 2.0 credits, grading scale: P, F
- PRO1 - Project, 1.0 credits, grading scale: P, F
- TEN1 - Examination, 5.0 credits, grading scale: A, B, C, D, E, FX, 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.

One written examination (TEN1, 5hp, grades A-F), one oral project presentation (PRO1; 1hp, grades P/F), laborations, exercises and study visit (LAB1; 2hp, grades 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.