FSK3520 Experimental Methods in Molecular Biophysics 8.0 credits

Experimentella metoder i molekylär biofysik

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

Establishment

Course syllabus for FSK3520 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Admitted to PhD studies in Physics, Biological Physics, or related fields of study.

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:

- describe 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.
- more specifically be able to judge what methods and in what way they can be applied/devleoped within the own area of research of the student.

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, and morespecifically within own area of research.

Disposition

Lectures (34h), laborations/excercises (8h), project task, control tests, study visit (6h). Oral presentation of how method(s) presented in the course can be applied within own area of research.

Course literature

Serdyuk IN et al, Methods in Molecular Biophysics, Cambridge Univ Press

Course literature: current edition is posted on the course's homepage no later than four weeks before the course starts.
Scientific articles.
Laboratory instructions.

Examination

- TEN1 - Exam, 4.0 credits, grading scale: P, F
- LIT1 - Literature assignment, 2.0 credits, grading scale: P, F
- LAB1 - Laboratory work, 2.0 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.

Other requirements for final grade

One written examination (TEN1, 4hp, grades P/F), two oral project presentations (PRO1; 2hp, 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.