



SK2520 Experimental Methods in Molecular Biophysics 8.0 credits

Experimentella metoder inom molekylär biofysik

Course syllabus for SK2520 valid from Autumn 17

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

Grading scale: A, B, C, D, E, FX, F

Education cycle: Second cycle

Main field of study: Biotechnology, Engineering Physics, Physics

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 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 main content

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)

Language of instruction

Language of instruction is specified in the course offering information in the course and programme directory.

Eligibility

Achieved BSc on any of the programs CMATD, CDATE, CELTE, CTFYS, CMAST, CFATE, or approved courses in mathematics and physics, corresponding to at least the courses in these subjects given on the above programs in the first three years.

Recommended previous knowledge:

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

Literature

Nathan R. Zaccai, Igor N. Serdyuk, Joseph Zaccai. Methods in Molecular Biophysics Structure, Dynamics, Function for Biology and Medicine, 2nd Edition. Cambridge University Press

(aktuell upplaga anslås på kursens hemsida senast fyra veckor innan kursstart).

Vetenskapliga artiklar.

Laborationsinstruktioner.

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

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)