



# SK2520 Experimental Methods in Molecular Biophysics 8.0 credits

## Experimentella metoder inom molekylär biofysik

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Course syllabus for SK2520 valid from Autumn 07

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

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.

## Literature

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

Scientific articles and hand-outs

Laboration instructions

## 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)