BB2165 Biomolecular Structure and Function 7.5 credits

Biomolekylers struktur och funktion

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

The courseplan is valid from spring 2022.

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Language of instruction

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

Intended learning outcomes

After completion of the course the student should be able to

- Explain in detail, formulate, analyze and evaluate fundamental concepts in structural biology.
- Based on knowledge and concepts acquired during the course, be able to propose, discuss and evaluate strategies for answering scientific questions in biology and biotechnology related to the structure and function of biomolecules.
- Use computer software tools and relevant databases to visualize, examine, analyze, evaluate and validate structures and function of macromolecules.
- Design, plan, implement and present in written and oral form an independent project in the field of biomolecular structure and function. A key aspect is to be able to critically evaluate one's own and others' chosen strategies for solving scientific problems from a biomolecular structure perspective. This also includes being able to evaluate and discuss biomolecular structure based on its importance for sustainable development.

Course contents

The structure and function of biomolecules (structural biology) is a cornerstone in modern biotechnology. The course aims offer deepened theoretical and practical knowledge about the relationship between structure and function of macromolecules. The focus is on proteins and nucleic acids, as well as biomolecules that are functionally relevant to the macromolecular systems that are being addressed.

In medical biotechnology, the relationship between the structure and function of proteins is an important basis for modern drug development, and in industrial biotechnology, the use and rational design of enzymes for sustainable bioprocesses are widely implemented approaches.

Structural biology is a young science and research in this area is moving forward rapidly. The precise topics and exercises covered are subjects of change to appropriately reflect the research frontier. Topics covered in the course range from the foundations of macromolecular structure to experimental and theoretical methodology of structure determination and validation, and the application of knowledge about structure-function relationship.

Specific prerequisites

A bachelor's degree, corresponding to at least 180 ECTS credits, including at least a total of 6 ECTS credits from courses in Biotechnology, Biochemistry, Molecular biology, Gene technology, Cell Biology or Microbiology, 20 ECTS credits in Chemistry, 20 ECTS Mathematics, Numerical methods or computer science, and documented proficiency in English corresponding to English B/6.

Examination

- LAB1 - Laboratory work, 1.5 credits, grading scale: P, F
- LIT1 - Literature task, 2.0 credits, grading scale: P, F
- TEN1 - Written exam, 4.0 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.

Grading criteria are specified in the course PM.

Other requirements for final grade

The written exam (TEN1) consists of two parts. The first part covers fundamental concepts in structural biology and is examined up to grade E. The second part covers more advanced knowledge that focus on applying knowledge such as strategies, critical analysis and evaluation, and is graded up to grade A. To pass the written exam requires at least grade E on both parts.

The laboratory part (LAB1) is examined by mandatory active attendance during the computer exercises and a written report that is handed in at the end of the exercise, or at the time decided by the examiner.

The project (module LIT1) is presented at the end of the course in the form of a written report, peer review of another student's report, and a short oral presentation. Parts of the project are expected to be performed outside class.

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.