Protein Structure and Function

Programme course

6.0 credits

Proteinstruktur och funktion

8BKA61

Valid from: 2021 Spring semester

Determined by
Chairman of The Board for First and Second Cycle Programmes

Date determined
2019-09-12

Revision date
2020-09-11

Main field of study
Medical Biology

Course level
Second cycle

Advancement level
A1X

Course offered for
- Bachelor´s Programme in Experimental and Industrial Biomedicine

Entry requirements
To enter the course requires at least 90 credits from semester 1-4 in the Bachelor's Programme in Experimental and Industrial Biomedicine.

Intended learning outcomes
Knowledge and understanding

Having completed the course, the student is expected to be able to:

- Identify common protein structural motifs in relation to structure and function
- Explain protein folding mechanisms and the factors that determines protein stability

Skills and abilities

On completion of the course, the student shall be able to:

- From laboratory data calculate protein stability and ligand interactions
- Obtain information from databases to be able to visualize protein structures and compare protein sequences

Judgement ability and approach

On completion of the course, the student shall be able to:

- Critically review detailed chemical and physical properties of proteins to draw conclusions about dynamic, structure and function

Course content

The course gives advanced knowledge in protein chemistry, protein engineering, structure- functional relationships, protein biophysical-chemical characteristics and techniques to characterize proteins. This includes studies of different protein structural motifs (like alpha- domain structures, alpha/beta structures and anti-parallel protein structures) that comprises membrane proteins and prediction of protein structures. Further, the course deals with physical- chemical properties of proteins and methods to study these properties. Elements of the course are chemical properties of polypeptides, protein engineering, physical interactions that determines protein properties, the role of hydrophobic interactions, flexibility in protein structures, protein stability, protein folding mechanisms, interaction with other molecules and enzyme catalysis. At computer laboratory sessions searches in databases are made to study three-dimensional protein structures and to simulate different structures.

The course encompasses the fields of biochemistry and protein chemistry.

Teaching and working methods

At the Faculty of Medicine and Health Sciences student centred and problem based learning make up the foundation of the teaching. The student takes responsibility for, studies and researches current content of the courses and study programme. The methods of the course work challenge the students to independently formulate questions for learning, to seek knowledge and in dialogue with others judge and evaluate achieved knowledge. Students in the Bachelor's programme in Experimental and Industrial Biomedicine work together in groups based on reality based and course related biomedical issues to apply their knowledges, develop their own learning, contribute to the fellow students' learning and to practice cooperation. Throughout the study programme theory is integrated with practical modules. The course methods and integration modules stimulates and support the student's ability to apply their knowledge and professional competence.

Work methods used on this course are lectures, lessons and laboratory sessions.

Examination

The form of examination is an individual written examination.
The written examination may be performed an unlimited number of times by those students who have not achieved a passing grade.

Examination and teaching are normally conducted in English.

Application for examination / written exam
Instructions on how to apply for examinations are given prior to the beginning of each course.

Retake of examination
Point of time for retake examination must normally be announced no later than the time of the regular examination. The extent of the retake examination must be the same as the regular examination.

Examination of students with functional disabilities
If LiU's coordinator for students with functional disabilities has issued a student the right to customized examination at a written hall examination the student has the right to this. If the coordinator instead has given the student a recommendation of customized examination or alternative examination form, the examiner can decide on this if the examiner consider it possible based on the objectives of the course.

Change of examiner
A student who has obtained a failing grade twice for a course or a part of a course is, after request, entitled to be appointed another examiner, unless there are special reasons to the contrary.

Grades
The course is graded with the grades Fail or passing grades 3-5, where 3 corresponds to approved, 4 corresponds to approved with credit and 5 corresponds to approved with distinction. The grade of the individual written examination (F, 3-5) is the basis for the final grade of the course.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Course literature

A literature reference list must be set no later than two months before the course begins by the programme committee for the Bachelor's Programme in Experimental and Industrial Biomedicine. There is no compulsory course literature.

Other information

Planning and implementation of the course is to be based on the wordings in the course syllabus. A course evaluation is compulsory for each course and should include how the course is in agreement with the course syllabus. The course coordinator will analyse the course evaluation and propose appropriate development of the course. The analysis and proposal will be returned to the students, the Director of Studies, and as needed to the Education Board, if related to general development and improvement.

The course is carried out in such a way that knowledge of gender, gender identity/expression, ethnicity, religion or other belief system, disability, sexual orientation and age is addressed, highlighted and communicated as part of the programme.

If the course is cancelled or undergoes major changes, examination is normally offered under this course syllabus, at a total of three occasions, within/in connection to the two following semesters, of which one in close proximity to the first examination.

Department

Institutionen för fysik, kemi och biologi