Protein Structure and Function

Proteinstruktur och funktion
6.0 credits

Programme course

8BKA61

Valid from: 2022 Spring semester

Determined by	**Main field of study**	
Chairman of The Board for First and Second Cycle Programmes	Medical Biology	
Date determined	**Course level**	**Progressive specialisation**
2019-09-12	Second cycle	A1X
Revised by	**Disciplinary domain**	
Chairman of The Board for First and Second Cycle Programmes	Natural sciences	
Revision date	**Subject group**	
2020-09-11; 2021-11-05	Chemistry	
Offered first time	**Offered for the last time**	
Spring semester 2021		
Department	**Replaced by**	
Institutionen för fysik, kemi och biologi		

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.

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.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

Application for examination

Instructions on how to apply for examinations are given prior to the beginning of each course.

Re-examination

The date for re-examination should normally be announced by the date of the regular examination at latest; in which case the scope must be the same as at the regular examination.

Examination for students with disabilities

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Nomination of another examiner

A student who has taken two examinations in a course or a part of a course without obtaining a pass grade is entitled to the nomination of another examiner, unless there are special reasons to the contrary.

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 conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

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.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.