# Biochemistry and Organic Chemistry

Biokemi och organisk kemi
6 credits

Programme course

8BKG26

Valid from: 2022 Spring semester

| **Determined by** | **Main field of study** | |
|---|---|---|
| Chairman of The Board for First and Second Cycle Programmes | Chemistry | |
| **Date determined** | **Course level** | **Progressive specialisation** |
| 2019-06-03 | First cycle | G1X |
| **Revised by** | **Disciplinary domain** | |
| | Natural sciences | |
| **Revision date** | **Subject group** | |
| 2021-05-03 | Chemistry | |
| **Offered first time** | **Offered for the last time** | |
| Spring semester 2020 | | |
| **Department** | **Replaced by** | |
| Medicinska fakulteten | | |

# Course offered for

- Bachelor´s Programme in Experimental and Industrial Biomedicine

# Entry requirements

General entry requirements for undergraduate studies
and
English corresponding to the level of English in Swedish upper secondary education (English 6)
And
Chemistry, Mathematics and Biology corresponding to the level in Swedish upper secondary education (Chemistry 2, Mathematic 4 and Biology 2)
Exemption from Swedish 3

# Intended learning outcomes

*Knowledge and understanding*
On completion of the course, the student shall be able to:

- Give the structures of different amino acids and their properties
- Describe the primary, secondary, tertiary and quaternary structure of proteins and describe the relationship between structure and function
- Explain protein synthesis, describe co- and post-translational modifications and describe important protein functions
- Explain the theory behind basic biochemical separation and analytical techniques
- Describe the formation, structures and important functions of carbohydrates and lipids
- Describe common functional groups in organic chemistry, their properties and nomenclature
- Know the principles of reaction mechanisms in organic chemistry and their conformation and stereochemistry

*Skills and abilities*
On completion of the course, the student shall be able to:

- Use basic separation- and analysis methods in biochemistry as well as interpret and present the results in a written report
- Apply organic chemistry nomenclature
- Use basic organic chemistry laboratory techniques

*Judgement ability and approach*
On completion of the course, the student shall be able to:

- Assess the toxicity of common chemicals and appropriate methods for the disposal of chemical waste

# Course content

The course focuses on basic biochemistry and organic chemistry. In the biochemistry part, the focus is on the structure and properties of amino acids and proteins, the structure of nucleic acids and basic mechanisms of through which genes are replicated and translated into proteins. The course also includes an introduction to the catabolism and anabolism of carbohydrates and lipids and enzymology. Laboratory sessions cover basic experimental methods such as gel filtration, polyacrylamide gel electrophoresis and spectrophotometry, and, where appropriate, assessment of the safety of the chemicals involved.
The organic chemistry part focuses on nomenclature, structures and the chemical and physical properties of the most common functional groups.
Basic organic chemical reactions and stereochemistry, biomolecules and laboratory methods are also studied.
The course covers biochemistry, organic chemistry and molecular biology.

# 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.
The work methods in this course are lectures, lessons, seminars and laboratory sessions.

# Examination

Teaching and examination are performed in English.

The form of examination is an individual written exam divided in two parts, biochemistry and organic chemistry. In addition, active participation in compulsory elements is required in order to pass the course. Compulsory elements include laboratory sessions with associated reports, seminars and written assignments.

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

**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. An aggregation of the grades from the two parts of the written exam forms the basis of 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 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.