Course syllabus for

General and Organic Chemistry, 20 credits

Allmän och organisk kemi, 20 hp
This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Course code	1BI019
Course name	General and Organic Chemistry
Credits	20 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedicine
Level	G2 - First cycle 2
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Medical Biochemistry and Biophysics
Participating institutions	• Department of Physiology and Pharmacology • Institute of Environmental Medicine
Decided by	Programnämnd 7
Decision date	2014-03-21
Revised by	Programme committee for study programmes in biomedicine
Last revision	2020-06-10
Course syllabus valid from	Autumn 2014

Specific entry requirements

Biology 2, Physics 2, Chemistry 2, Mathematics 4 (field specific entry requirements A13). Or: Biology B, Physics B, Chemistry B, Mathematics D (field specific entry requirements 13).

Objectives

Upon completion of the course, the student should be able to:
regarding knowledge and understanding:

- describe, classify and systematically name (organic) molecules based on chemical and physical characteristics,
- explain and predict mechanisms of basic organic-chemical reactions,
- describe and classify chemicals according to their risks in the laboratory and for the environment,
- describe the relationships between molecular structure and pharmacological effect of drugs and between their physico-chemical properties and bioavailability.

Regarding skills and abilities:

- perform basic organic-chemical laboratory work independently and safely, have knowledge of and be able to describe the risks associated with the procedures and chemicals used,
- describe and analyse own organic-chemical laboratory work by, for example, writing a well-structured, understandable and complete report following scientific ethics for publishing results,
- choose separation and analytical methods for basic chemical problems and interpret simple chromatograms and analysis spectra,
- search and find relevant original and overview literature concerning organic-chemical questions to retrieve information for problem-solving and communication to others.

Regarding judgement and approach:

- describe procedures and suggest applications of modern drug design, and reflect on it in the context of drug development by the pharmaceutical industry.

Content

The course content is oriented towards substances and methods of special biomedical interest and provides a basis for later courses in the programme.

The course is divided into the following 6 parts:

Basic chemistry, 2.0 hp

Grading scale: GU

Carbonyl and unsaturated compounds, 3.0 hp

Grading scale: GU

Organic and bioorganic chemistry, incl project work, 2.0 hp

Grading scale: GU

Environmental and medicinal chemistry, 1.0 hp

Grading scale: GU

Organic-chemical laboratory work, 6.0 hp

Grading scale: GU

Laboratory techniques with laboratory safety. Common methods in organic-chemical and bioorganic synthesis work. Classification and labeling of chemicals, standard values and limits. Lab reports.

Integration of theory and practice, 6.0 hp

Grading scale: VU

Teaching methods

The teaching includes lectures, laboratory sessions, group tuition (seminars), study visits and project work. It is, to a large extent, directed towards problem-solving. The project work is an advanced study in groups, with an emphasis on integration of own work and literature studies.

Examination

Part 1. Basic chemistry (2 credits). The examination consists of a written test. Graded Fail/Pass.

Part 2. Carbonyl and unsaturated compounds (3 credits). The examination consists of a written test. Graded Fail/Pass.

Part 3. Organic and bioorganic chemistry, incl. project work (2 credits). The examination consists of an oral presentation of the project work. Graded Fail/Pass. A written test with voluntary participation will be offered. The results of this test may be beneficial for grading of the course (bonus points).

Part 4. Environmental and medicinal chemistry (1 credit). The examination consists of a poster presentation about the study visit. Graded Fail/Pass.

Part 5. Organic-chemical laboratory work (6 credits). The examination consists of a written test in laboratory safety and techniques, observations of the student's laboratory skills, and labreports. Graded Fail/Pass. The results of lab reports may be beneficial for the grading of the course (bonus points).

Part 6. Integration of theory and practice (6 credits). The examination consists of a written exami covering te entire content of the course. Graded Fail/Pass/Pass with distinction. For participation in the written examination it is required that the part 1 (Basic chemistry) and part 2 (Carbonyl and unsaturated compounds) are passed. To pass the whole course the grade of pass must have been obtained for all parts of the course. The final grade for the whole course is based on the grade for the part 6 (Integration of theory and practice) and the collected bonus points.

Compulsory participation
Laboratory sessions, project work, and study visit are compulsory, as well as presentations and lectures linked to these parts. Part of the course is an examination in laboratory safety and technology that must be passed before start of the subsequent laboratory sessions. At the beginning of each laboratory session, an oral examination is performed that must be approved before the student starts experimenting. The course director assesses if and, in that case, how absence can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the course director's instructions, the student's results for respective part will not be registered in LADOK.

Limited number of examinations or practical training sessions
Students who have not passed the first examination are entitled to participate in five more examinations. If the student has not passed the exam after four attempts he/she is encouraged to contact the study advisor. If the student has failed six examinations, no additional examination or new admission is provieded.

The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination, for which the student registered but not participated in, will not be counted as an examination.

Transitional provisions

The course is cancelled and was offered for the last time HT16. Examination according to this syllabus will be offered for the last time VT21 for students who have not completed the course with a passing grade.

Other directives

The course language is English.

Course evaluation will be carried out in accordance with the guidelines established by the Board of Higher Education.

Oral evaluation in the form of course council meetings will be carried out during the course.

Literature and other teaching aids

Mandatory literature

Fessenden, Ralph J.; Fessenden, Joan S.; Logue, Marshall W.

Organic chemistry

Pienta, Norbert J.; Kessler, Robert J.; Young, Paul R.

6. ed. : Pacific Grove, Calif. ;a London : Brooks/Cole, Grove, Calif. ;a London :b Brooks/Cole,c 1998 - 1170 s.

ISBN:0-534-35199-9 LIBRIS-ID:5037202

Library search

Byström, Styrbjörn; Cronholm, Tomas; Rothstein, Susanne

Laboratory manual and safety guidelines for organic chemistry. Study program in Biomedicine (bachelor)

Karolinska institutet, 2014

The manual will be distributed in class.

Recommended literature

Berg, Jeremy M.; Tymoczko, John L.; Stryer, Lubert

Biochemistry

7. ed., International ed. : Basingstoke : Palgrave Macmillan, cop. 2012 - xxxii, 1098, [78] s.

ISBN:978-1-4292-7635-1 LIBRIS-ID:12135215

Library search

Only two chapters (8 and 9) of the textbook "Biochemistry" (Berg et al.) are relevant to the course, so it is sufficient to borrow the book from the library for your studies instead of buying it.