



DEPARTMENT OF CHEMISTRY AND MOLECULAR BIOLOGY

KEM022 Basic Chemistry 2A Organic Chemistry, 7.5 credits

Grundläggande kemi 2A Organisk kemi, 7,5 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Chemistry and Molecular Biology on 2021-02-05 to be valid from 2021-02-05, spring semester of 2021.

Field of education: Science 100%

Department: Department of Chemistry and Molecular Biology

Position in the educational system

The course is classified at the level 0-30 credits for Degree of Bachelor. Alternatively, it can be read as a free-standing course.

The course can be part of the following programmes: 1) Molecular Biology, Master's Programme (N2MBI), 2) Marine Science, Bachelor's Programme (N1MAV), 3) Programme in Pharmacy (F2APP), 4) Bachelor's Programme in Earth Sciences (N1GVS), 5) Marine Science, Master's Programme (N2MAV), 6) Bachelor of Science in Environmental Science (N1MVN), 7) Bachelor's Programme in Biology (N1BIO), 8) Environmental Sciences (N2MVN), 9) Bachelor's Programme in Molecular Biology (N1MB1) and 10) Bachelor of Science Programme in Chemistry (N1KEM)

Main field of studies

Chemistry

Specialization

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Entry requirements

For admission to the course, completed course KEM011 is required, Basic chemistry 1 (15 credits) or the equivalent knowledge.

Learning outcomes

The aim of course is to give basic theoretical knowledge in organic chemistry as well as much basic experimental proficiencies in the subject. Knowledge that is necessary for continued studies in chemistry or to the chemistry adjacent fields will be presented. This course should furthermore give an increased understanding of chemical reactions and processes that happen in our environment.

After completion of the course, the student should be able to:

Knowledge and understanding

- identify and name selected functional groups according to IUPACs nomenclature as well as name selected compounds with trivial names
- identify and categorise basic stereochemical concepts

Competence and skills

- reproduce molecules by means of different structural representations,
- explain and utilise/apply relationship between structure and reactivity
- explain and apply selected reaction mechanisms
- use given basic experimental methods for synthesis, purifying, separation and identification of synthetic products,
- compile laboratory result written in a scientific way.

Judgement and approach

- utilise the chemical literature for risk analyses
- explain and assess meaning of popular articles and scientific reports in the above fields.

Course content

The course consists of 2 Sub-courses.

In the course, attention is paid to relationship between compounds' name and structure according to IUPAC:s nomenclature system. In the laboratory sessions (sub-course 2) strong emphasis is placed at environment and health risks. The laboratory components illustrate chosen parts of the theoretical contents of course.

Sub-courses

1. Organic chemistry, theory (*Organisk kemi, teori*), 4.5 credits

Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

Module treat chosen functional groups' structure, properties and reactivity. Chosen reactions as well as their use in organic synthesis are concerned. Furthermore, the

course up takes some selected reaction mechanisms, such as addition, elimination and substitution. Special focus is placed on stereochemistry and structural representation of organic compounds, such as by means of computer-based drawing programs.

Following compounds categories (functional groups) are treated:

- Alifatic hydrocarbons
- Aromatic compounds
- Alkyl halides
- Esters, epoxides and sulphides
- Alcohol, thiols and phenols
- Amines
- Carbonyl compounds, aldehydes, ketones
- Carboxylic acids and their derivative: esters, amides, acid anhydrides, acid halides and nitriles
- Carbohydrates
- Chosen heterocycles

2. Organic chemistry, laboratory exercises (*Organisk kemi, laborationer*), 3 credits
Grading scale: Pass (G) and Fail (U)

The laboratory course in organic chemistry includes basic skills in laboratory technology such as production and purifying of organic compounds.

Practical components that are brought up during the laboratory course are:

- Heating, stirring
- Vacuum, evaporation
- Separation, extraction
- Drying of solutions
- Crystallisation, distillation
- Thin layer chromatography (TLC)
- Melting point, Boiling point

Form of teaching

Sub-Course 1 : The teaching is given in the form of lectures and assisted problem solving.

Sub-Course 2: The teaching includes security test, a number of stated experiments as well as a computer exercise. Attendance at security test as well as at the carrying out the stated experiments is compulsory. In addition should laboratory reports deliver in connection with each laboratory session according to criteria that are presented during

course.

Language of instruction: Swedish and English

As principal rule, the course is given in Swedish but can be given completely or partly in English if the circumstances require it.

English-speaking reading list can occur.

Assessment

Sub-course 1: Examination takes place through subtests that are given during the course and a written examination at the end of module.

Sub-course 2: Examination takes place through compulsory attendance at security test as well as at the carrying out the experiments and through approved laboratory accounts for the stated experiments. Laboratory reports are assessed according to criteria that are presented during the course. Criteria describe content of reports as well as time frames for submission and maximum number audits.

For students who have not achieved the grade G in sub-course 1 at a regular examination session, is offered additional examination sessions. For students who have achieved the grade G in sub-course 2 at regular laboratory session is offered additional occasions on the following course in case of a vacancy.

If student who has failed twice on the same assessing component, examiner renewal want before the next examination session, should the such request submit in writing to department and be approved if there are not special causes on the other hand. (HF 6 chapters section 22)

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course was given.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Sub-course 1: For the grade G, at least 60% of the maximum score is required in the written exam. For the grade VG, at least 75% of the maximum score is required in the written exam.

Sub-course 2: To pass are required attendance at all compulsory components and at least 60% of the maximum score is required on all laboratory reports, and a minimum of 50% of the score on each individual laboratory report.

Final grade: For final grade G on the course, G is required for all sub-course. For final grade VG on the course, VG on Sub-course 1 G on Sub-course 2 are required. Regarding application of ECTS grading scale, see Vice-chancellor decision 28/05/2007, diary nr G 8 1976/07.

Course evaluation

A course evaluation is done in relation to the intended learning outcomes and content of the course. It is performed at the end of the course through an individual written questionnaire on the virtual learning environment at University of Gothenburg.

A student who participates in or has completed a course should be given possibility to anonymously express experiences of and views in the course in a course evaluation. A compilation of course evaluation and reflections of the responsible teacher should be made available to the students within reasonable time after the end of the course. Next time the course is given the compilation and, if applicable, actions taken should be presented for the students.