UNIVERSITY OF GOTHENBURG

DEPARTMENT OF CHEMISTRY AND MOLECULAR BIOLOGY

KEM750 Advanced Organic Synthesis, 15 credits

Avancerad organisk syntes, 15 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Chemistry and Molecular Biology on 2016-09-01 and was last revised on 2017-10-06 to be valid from 2017-10-06, spring semester of 2017.

Field of education: Science 100%
Department: Department of Chemistry and Molecular Biology

Position in the educational system

The course is classified as a second-cycle course and can be read as a freestanding course.

The course can be part of the following programmes: 1) Master's Programme in Organic and Medicinal Chemistry (N2KEL) and 2) Master's Programme in Chemistry (N2KEM)

Main field of studies	*Specialization*
Chemistry	A1F, Second cycle, has second-cycle course/s as entry requirements

Entry requirements

For admission to the course, passed courses comprising 90 credits in chemistry are required, including course KEM815 Advanced organic chemistry (15 credits) or equivalent course, furthermore English B/English 6 or equivalent knowledge. Students with equivalent education can after assessment be given admission to the course.

Learning outcomes

On completion of the course, the student is expected to be able to:

Knowledge and understanding

- **describe** a variety of modern synthesis methods for transformation of functional groups as well as formation of new carbon-carbon and carbon-heteroatom bonds.

Competence and skills

- **plan** efficient multistep syntheses of complex molecules by means of retrosynthetic analysis,
- **identify** and **remedy** selectivity issues by choice of appropriate synthesis methods and protective groups,
- **describe** a variety of modern synthesis methods for transformation of functional groups as well as formation of new carbon-carbon and carbon-heteroatom bonds,
- **present** synthesis methods from the literature in oral and written form.

Judgement and approach

- **evaluate** a proposed synthesis path with regard to access of appropriate start materials selectivity,
- **assess** different synthesis methods' "atom efficiency" as well as environment and health risks.

The course is sustainability-related, which means that at least one of the learning outcomes clearly shows that the course content meets at least one of the University of Gothenburg's confirmed sustainability criteria.

Course content

- Repetition and deepening of methods for transformation of functional groups
- Retrosynthetic analysis
- Synthesis strategy including "atom efficiency" and environment and health aspects
- Chemistry of protective groups
- Selectivity and reactivity of reagent and functional groups
- Modern methods for the formation of carbon-carbon and carbon-heteroatom bonds

Form of teaching

The teaching is given in the form of lectures, group work and literature seminars. In the seminar part, each student stands for the teaching at two to three occasions. Group work and literature seminars are compulsory and relevant for grading.

Language of instruction: Swedish and English

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

Assessment

The examination is based on

- theoretical tests that are organised continuously during the course
- the seminar part where the student stands for the teaching,
- submitted literature assignments.

Each student is assessed jointly by two examiners.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
The individual grading-relevant components are graded. The final grade is decided by weighing together the individual grades.

Regarding application of the ECTS scale for grade please see decision 28/05/2007, diary nr G 8 1976/07.

Course evaluation

The course is evaluated and the results become subject to discussion between the teachers in the course and representatives for the students. Notes from this discussion, together with the written course evaluation, will be reported to the student affairs office for chemistry where they are available as public documents.