Faculty of Health, Science and Technology
Chemistry

Syllabus

Organic Chemistry

Course Code:	KEGA02
Course Title:	Organic Chemistry *Organisk kemi*
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
KEA (Chemistry)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2016-02-19, and is valid from the Autumn semester 2016 at Karlstad University.

Prerequisites
Materia (CBGAMO 7.5 ECTS cr) or Introductory Chemistry (KEGA21, 7.5 ECTS cr) attended, or equivalent.

Learning Outcomes
The aim of the course is that students acquire the basic knowledge of organic chemistry required for further studies in chemistry and chemical engineering.

Upon completion of the course, students should be able to
- give an account of how basic chemical bonding theory can be used to describe electronic structures and chemical bonding in organic molecules,
- give an account of the principles of systematic nomenclature in organic chemistry and apply the IUPACS rules for naming basic organic molecules,
- use different structure representations to describe organic molecules, including the occurrence of stereoisomers and geometric isomers,
- give an account of the most important functional groups and their properties, and give examples of the preparation and use of different functional groups,
- analyse the relation between molecular structure and physical or chemical properties,
- give an account of the most important mechanisms for substitution, elimination and addition reactions, and of factors affecting reactivity in such reactions,
- give an account of the electronic structure in conjugated and aromatic systems,
- give examples of the oxidation and reduction of organic compounds and of the reagents used for such reactions,
- outline the production and use of Grignard and organolithium reagents,
- perform simple syntheses and use the unit operations extraction, filtration, crystallisation, and

destillation in small-scale laboratory work, including assessment of safety and effects on the working and physical environment.

Content
The course comprises a theory module (4.5 ECTS cr) and laboratory work module (3 ECTS cr), which are assessed separately.

The Theory Module, 4.5 ECTS cr comprises:
- Brief overview of chemical bonding
- Nomenclature of organic molecules and various forms of graphical descriptions of their structures
- Properties and the most important reactions of alkanes, alkenes, alkynes, aromatics, alkyl halides, alcohols, esters, carbonyl compounds, and amines.
- The use of substances of the groups above for synthetic purposes, illustrated by products and processes used in society
- Reaction mechanisms for a selection of addition, substitution, elimination and rearrangement reactions in relation to the groups of substances above.

Laboratory Work Module, 3 ECTS cr comprises:
- Safety and hazard regulations
- Simple syntheses including the unit operations operations extraction, filtration, crystallisation, and destillation
- Thin layer chromatography and melting point determination
- Report writing and routines for laboratory notes.

Attendance is mandatory for the scheduled laboratory sessions.

Reading List
See separate document.

Examination
Assessment of the theory module is based on a final written examination.
Assessment of the laboratory work module is based on a written exam on safety regulations and on the lab reports from the mandatory lab sessions.

Grades
One of the grades Fail (U), Pass (G), or Distinction (VG), or one of the grades Fail (U), Pass (3), Some Distinction (4), or Distinction (5) is awarded in the examination of the course.

Quality Assurance
Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate
A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.