



# KD1270 Organic Chemistry, Basic Concepts and Practice 2 7.5 credits

Organisk kemi, grundläggande koncept och praktik 2

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for KD1270 valid from Spring 2020

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Technology

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

After passing the course the student should be able to:

- compare and describe the reactivity of different functional groups in order to explain organic chemistry reactions and mechanisms
- apply the green chemistry concept to evaluate organic chemical reactions and processes from a sustainable development perspective
- utilize laboratory techniques to carry out synthetic procedures
- interpret information from NMR spectroscopy

## Course contents

The course is designed to provide a continued introduction to organic chemistry as a complement to the course Organic Chemistry, basic concepts and practice (KD1230). The emphasis is on imparting understanding of organic chemical principles and reactions, and provide sufficient knowledge to be able to absorb higher courses in organic chemistry.

Short course description:

- Models for estimation of reactivities (frontier orbital theory / hard-soft acid-base concept)
- Reaction types
- Radical chemistry
- Conjugation and aromaticity
- Conjugated systems and aromatic substances, structure and reactivity
- Pericycliska reactions
- Basic organometallic chemistry
- Oxidation and reduction
- NMR spectroscopy
- Carbonyl compounds and analogous substances
- Carboxylic acids, their derivatives and analog compounds
- Reactivity and synthetic methods for common functional groups
- Green and sustainable organic chemistry
- Information retrieval in SciFinder and Reaxys
- Basic laboratory techniques: green chemistry, multistep synthesis, chromatography, spectroscopy

Detailed course description:

- describe and classify the main organic reaction types
- describe the reactivities and basic synthesis methods for common functional groups
- describe the concepts of conjugation, aromaticity and pericyclic reactions
- describe the reactivities and synthesis methods regarding conjugated systems

- describe the reactivities and synthesis methods in aromatic synthetic chemistry
- account for the structures and properties of carbonyl compounds and their analogs
- describe the reactivities and synthesis methods for carbonyl compounds and their analogs
- describe the concepts of oxidation and reduction, as well as oxidative and reductive synthesis methods
- describe specific synthesis methods in natural product chemistry
- account for structural analysis using NMR spectroscopy
- analyze and evaluate organic chemical reactions and processes from a sustainable development perspective based on the principles and methods of the green chemistry concept
- search for information in databases and from the chemical literature, and extract relevant information
- summarize and process the extracted information in a written report
- perform advanced laboratory techniques: enhanced synthesis methodology, green chemistry, chromatography
- analyze compounds and reaction outcomes with NMR spectroscopy, and IR spectroscopy

## Specific prerequisites

KD1230 Organic chemistry, basic concepts and practice, or equivalent

## Examination

- LAB1 - Laboratory Practice, 3.0 credits, grading scale: P, F
- PRO1 - Project, 1.5 credits, grading scale: P, F
- TEN1 - Written exam, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.