# KD2320 Spectroscopic Tools for Chemistry 9.0 credits

## Spektroskopiska verktyg inom kemi

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 KD2320 valid from Autumn 2017

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Chemical Science and Engineering,Chemistry and Chemical Engineering

## Specific prerequisites

**Admission requirements for programme students at KTH:**
At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes:
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.
**Admission requirements for independent students:**
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp)

in mathematics and 6 university credits (hp) in computer science or corresponding. Documented proficiency in English corresponding to English B.

## Language of instruction

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

## Intended learning outcomes

The aim of the course is to develop the knowledge and the understanding of nuclear magnetic resonance spectroscopy (NMR), mass spectrometry (MS), infrared (IR) and Raman spectroscopies in order to elucidate molecular structures and dynamics.

After completion of the course the student should be able to

- describe the principles of NMR, MS, IR and Raman methods with special regard to their advantages and limitations,

- analyze the NMR, MS, IR and Raman spectra, interpret and use the relationship between the spectral parameters and the molecular structure,

- make a proper choice and strategy for analysing and solving structural problems,

- recognize and explain the effects of molecular dynamics such as chemical exchange in the spectra.

## Course contents

Basic principals of nuclear magnetic resonance spectroscopy (NMR), mass spectrometry (MS), infrared (IR) and Raman spectroscopies. Interpretation of spectra to elucidate molecular structures and dynamics.

The course contains lectures, tutorials and laboratory practices. Tutorials will supplement the lectures and a significant amount of time will be spent on solving problems and answering questions. Regular homework projects of gradually increasing complexity provide the students with working knowledge of the topics.

## Course literature

On-line literature recommended by the lecturers

## Examination

- LAB1 - Laboratory Work, 4.0 credits, grading scale: P, F
- TEN1 - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F

- ÖVN1 - Home Assignments, 1.0 credits, grading scale: P, 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.

## Other requirements for final grade

Laboratory work (LAB1; 4 credits)
Examination (TEN1; 4 credits)
Exercises and Home Assignments (ÖVN1; 1 credits)

The final grade will be grade of the examination

## 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.