



# FKE3150 Molecular Response Theory and Spectroscopy 5.0 credits

Molekylär responsteori och spektroskopi

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 FKE3150 valid from Spring 2019

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

## Language of instruction

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

## Intended learning outcomes

To understand the theory for interactions between light and molecular systems, including

- how classical electrodynamic fields are introduced in the quantum mechanical Hamiltonian
- how one from the Schrödinger equation determines response functions in the frequency domain
- how a selection of response functions couples to spectroscopic observables

## Course contents

The course provides comprehensive presentations of time-dependent response theory and electrodynamics. Response theory is explored in the time and frequency domains and with use of different quantum mechanical formulations. Electrodynamics is targeted towards an understanding of internal and external field interactions in/with molecular systems. More applied lectures cover presentations of linear and nonlinear optical properties, vibrational spectroscopies, UV/vis and X-ray absorption spectroscopies and birefringences, and magnetic resonance spectroscopies.

## Disposition

1 week of preparatory studies, 1 week (Mon–Fri) of lectures (38 hours in total) at different location (international PhD school), 1 week of solving homework problem.

## Examination

- HEM1 - Home assignment, 5.0 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.

## 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.