



**LUND**  
UNIVERSITY

Faculty of Science

## **KEMB29, Chemistry: Spectroscopy and Dynamics, 7.5 credits**

*Kemi: Spektroskopi och dynamik, 7,5 högskolepoäng*

First Cycle / Grundnivå

---

### **Details of approval**

The syllabus was approved by Study programmes board, Faculty of Science on 2008-04-29 and was last revised on 2008-04-29. The revised syllabus applies from 2008-04-30, autumn semester 2008.

### **General Information**

The course is a compulsory first-cycle course for a degree of Bachelor of Science, main field of subject Chemistry.

*Language of instruction:* Swedish and English  
When necessary, the course in full is given in English.

*Main field of studies*

Chemistry

*Depth of study relative to the degree requirements*

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

### **Learning outcomes**

The course intends to give basic knowledge in physical chemistry within the fields of spectroscopy and dynamics and their applications within natural sciences. The included laboratory course intends to give skills for both experimental and theoretical studies within these fields.

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

- explain the basic relationships between the quantum mechanical description of molecular systems and spectroscopic observations
- describe the physical basics of light- and electron spectroscopic methods
- carry out basic interpretation of spectroscopic measurement data
- decide molecular symmetry
- derive molecular structure from vibrational spectroscopic data and molecular symmetry
- formulate and solve kinetic equations that describe chemical reactions and to interpret and transfer kinetic data and equations into reaction mechanisms

- describe the basics of chemical dynamics

## Course content

The course consists of two parts. The first part treats different spectroscopic methods that can be used to examine properties of molecules.

The basics of chemical dynamics are given in part two. This includes derivation and solution of differential equations that describe different chemical reactions and description of the molecular basics of elementary chemical dynamics. Further, Marcus theory for electron transmission and Förster theory of energy transfer are treated and compared.

The course contains both experimental and computer-based laboratory sessions.

## Course design

The teaching consists of lectures, calculation exercises and laboratory sessions. The laboratory work is compulsory.

## Assessment

The course is examined by a written examination at the end of the course. A re-sit examination is offered soon after the examination to students who do not pass.

*Subcourses that are part of this course can be found in an appendix at the end of this document.*

## Grades

Marking scale: Fail, Pass, Pass with distinction.

To be awarded Pass students must pass the examination and pass the laboratory work.

The examination grades are: Pass with Distinction, Pass or Fail. Grades for laboratory work and the compulsory elements included therein are: Pass and Fail.

The final grade for the course is determined by the grade on the final examination.

## Entry requirements

To be eligible for this course students must have basic eligibility and passes in courses equivalent to:

- KEMA00 General and Analytical Chemistry 7.5 credits, KEMA01 Organic Chemistry – Basic Course 7.5 credits, KEMA02 Inorganic Chemistry – Basic Course 7.5 and KEMA03 Biochemistry – Basic Course 7.5 credits, or KEM101 General Chemistry 1 15 credits and KEM102 General Chemistry 1 15 credits, or KEM111 Chemistry for Environmental and Biological Sciences – General Course 1 15 credits and KEM122 Chemistry for Environmental and Biological Sciences – General Course 2 15 credits

and

- KEMB09 Physical Chemistry – Basic Course 15 credits or KEM103 General Chemistry 1 15 credits, and
- one of the courses MATA01 Mathematics for Scientists 1 15 credits, MATA11 Mathematics 1 Alpha 15 credits, MAT015 Mathematics for Scientists 1 15 credits or MAT131 Mathematics 1 Alpha 15 credits.

Equivalent knowledge that has been gained in another way also provides eligibility for the course.

## Subcourses in KEMB29, Chemistry: Spectroscopy and Dynamics

Applies from H13

- 0811 Spectroscopy and Dynamics, 5,5 hp  
Grading scale: Fail, Pass, Pass with distinction
- 0812 Spectroscopy and Dynamics, Laboratory Work, 2,0 hp  
Grading scale: Fail, Pass

Applies from H08

- 0801 Spectroscopy and Dynamics, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction
- 0802 Spectroscopy and Dynamics, Laboratory Work, 0,0 hp  
Grading scale: Fail, Pass