

## KEMM19, Chemistry: Optical Methods in Molecular Spectroscopy, 15 credits

*Kemi: Optiska metoder i molekylär spektroskopi, 15 högskolepoäng*  
Second Cycle / Avancerad nivå

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### Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2011-09-08 to be valid from 2011-07-01, autumn semester 2011.

### General Information

The course is included in the main fields of Chemistry and Organizing Molecular Matter at the Faculty of Science.

The course is an optional second-cycle course for a degree of Master of Science, main field of subject Chemistry and main field of subject Organizing Molecular Matter.

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

| <i>Main field of studies</i> | <i>Depth of study relative to the degree requirements</i>              |
|------------------------------|------------------------------------------------------------------------|
| Organizing Molecular Matter  | A1N, Second cycle, has only first-cycle course/s as entry requirements |
| Chemistry                    | A1N, Second cycle, has only first-cycle course/s as entry requirements |

### Learning outcomes

The course aim is to provide advanced knowledge of optical spectroscopy and in-depth understanding of various types of lasers and how lasers can be used in spectroscopic experiments.

On completion of the course, the students should have acquired the following knowledge and skills:

- describe the physical principles for elementary photochemical reactions
- explain the theoretical basis for lasers and describe how lasers can be used in elementary optical experiments

- describe the function of various types of detectors and their fields of use
- on an advanced level account for the relationship between optical measurements and molecular properties

## Course content

The course comprises one theory section of 7.5 credits and laboratory work and exercises comprising 7.5 credits.

*Lectures:* Presentation of basic terms and principles in photochemistry and spectroscopy. Optical experiments with special emphasis on use of lasers in optical measurements will be treated. The relationship between time- and energy resolved experiments will be analysed.

*Exercises:* are performed in direct connection to the lectures within the respective field.

## Course design

Teaching comprises lectures, exercises and laboratory work. The exercises and laboratory work are compulsory components.

## Assessment

The course is assessed with a written or oral examination.

Re-sit examinations are 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 on the whole course, students must pass the examination and pass the laboratory work and exercises.

The examination grades are: Pass with Distinction, Pass or Fail. Grades for the laboratory work and exercises are: Pass or Fail.

The final grade for the course is determined by weighting the results of the examination and the compulsory components.

## Entry requirements

To be eligible for this course students must have basic eligibility, English B and 90 higher education credits in completed Science courses, including 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 credits and KEMA03 Biochemistry – Basic Course 7.5 credits

and

- KEMB09 Physical Chemistry – Basic Course 15,
- KEMB08 Molecular Interactions and Structure 15 credits and
- one of the courses MATA01 Mathematics for Scientists 1 15 credits or MATA14 Mathematics: Analysis 1 15 credits

Admission requirements are also fulfilled for those with basic eligibility, English B and passes in courses equivalent to:

- 90 credits in Physics including FYSA31 Physics 3: Modern Physics 30 credits and
- 30 credits in Mathematics

or

- 60 credits in Chemistry, 60 credits in Physics and 60 credits in Mathematics

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

### **Further information**

The course cannot be credited as part of a degree programme that also includes KEMM09 Optical Methods in Molecular Spectroscopy 15 credits.

## Subcourses in KEMM19, Chemistry: Optical Methods in Molecular Spectroscopy

Applies from H11

- 1101 Optical Methods in Molecular Spectroscopy, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction
- 1102 Optical Methods in Molecular Spectroscopy, Comp. Elements, 7,5 hp  
Grading scale: Fail, Pass