



# SK181N Lasers and Applications 6.0 credits

## Laser med tillämpningar

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

## Establishment

Course syllabus for SK181N valid from Spring 2009

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Physics, Technology

## Specific prerequisites

- **General requirements**, i.e. completed upper secondary education including documented proficiency in Swedish and English (for courses given in Swedish) or including documented proficiency in English (for courses given in English).
- **Specific requirements:** knowledge of Mathematics corresponding to Mathematics D, Physics corresponding to Physics B and Chemistry corresponding to Chemistry A is required.

## Language of instruction

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

## Intended learning outcomes

The course aims to give basic knowledge about the construction and functioning of the laser. The course will also show how the laser can be used within application as information technology, environmental science and medicine.

After the course the student will be able to:

- solve technical problems concerning frequency conditions and mode structure of a laser
- explain how a resonator is designed and how it works, and how to use suitable measuring methods and instrumentation to be able to perform diagnostics on a laser
- explain level diagrams of the laser medium
- make calculations on Gaussian beams
- make calculations on energies needed for laser welding, cutting and drilling.
- describe applications within fields as optical communication, CD-players, holography, laser fusion, laser environmental science.
- use search engines on scientific information and on scientific literature in a systematic way
- explain front areas as femtosecond spectroscopy, laser ionization spectroscopy and LIBS within material science.

## Course contents

Laser principles, the first laser, laser history, laser light and Gaussian beams, laser resonators, the laser medium, laser diagnostics, and applications; Holography, Optical communication, CD-DVD-players, liquid crystals, lasers within environmental techniques, laser welding, drilling and cutting. LIBS-methodology in material science, lasers in medicine, laser ionisation and laser fusion.

## Disposition

Internet course examined on the internet

## Course literature

Internet book: <http://kurslab.physics.kth.se/~berg/Lasers.html>

## Examination

- **TEN2** - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

- **TEN1** - Examination, 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.

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

Exams on the internet

## **Other requirements for final grade**

The course is examined by two written exams

## **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.