



# SK2411 Laser Physics 7.5 credits

## Laserfysik

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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 SK2411 valid from Autumn 2008

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Engineering Physics, Physics

## Language of instruction

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

## Intended learning outcomes

Student after the course should be able to:

- explain operational principles and construction of lasers
- give an account of technological issues behind laser construction
- describe optical components that can be used to tailor the properties of the laser
- relate the laser operation principles to atom and molecular physics, solid state physics, quantum mechanics and physical optics.

## Course contents

Essentials of quantum-mechanical description of optical gain media, including atoms, molecules, and solid state materials.

Essentials of quantum-mechanical description of the interaction between photons and electrons in optical gain media.

Basic properties of lasers and photon amplifiers.

Physical principles of laser action.

Essential knowledge of laser building blocks.

Overview of the most important laser types.

## Specific prerequisites

Recommend previous knowledge:

Course in general physics (e.g. SK1100, ECTS 9 points), Course in quantum mechanics (e.g. SI2170 9 ECTS points), Course in quantum electronics including electrooptics (e.g. SK2400 12 ECTS points)

## Course literature

Svelto, Orazio , Principles of Lasers, Fourth edition (Translation by David. C. Hanna) Kluwer Academic/Plenum Press, Springer (1998 or later) ISBN 0-306-45748-2

## Examination

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.

Written exam (TEN1; 5,5 hp, grading scale A/B/C/D/E/Fx/F) Lab reports (LAB1; 2 hp, grading scale P/F)

# 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.