SK2411 Laser Physics 7.5 credits

Laserfysik

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

Establishment

The course syllabus is valid from Spring 2022 according to the school principal's decision: S-2022-0529 Decision date: 2022-02-24

Grading scale

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

Education cycle

Second cycle

Main field of study

Physics, Engineering Physics

Specific prerequisites

English B / English 6

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 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.

Examination

- TEN1 - Examination, 5.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 2.0 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.

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

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.