FSK3421 Nonlinear Optical Technology 12.0 credits

Ickelinjär optisk teknologi

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 FSK3421 valid from Spring 2010

Grading scale

Education cycle

Third cycle

Specific prerequisites

MSc degree in physics or equivalent education.

Specifically, it is assumed that the student has a working knowledge of vector analysis, EM-wave theory, atomic and molecular physics, basic laser physics, and solid-state theory and physics.

Language of instruction: English only

Language of instruction

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

Intended learning outcomes

The aim of the course is that the student shall:

- have acquired a thorough understanding of the basic theory and science of nonlinear optics
- be able to describe and to analyze in detail the theory of salient components and basic systems employed within modern nonlinear optics
- be able to formulate a physically reasonable and complicated problem in nonlinear optics and provide an extended solution to the same,

and

- present the problem and discuss the solution in front of the whole class

Course contents

Introduction to nonlinear optics, resonant and nonresonant processes, nonlinear optical material and applications, ultrashort optical pulses, nonlinear optical fibers, Raman and Brilloin scattering, nonlinear waveguides and photorefraction and optical damage in materials.

Course literature

P N Butcher and D Cotter: The Elements of Nonlinear Optics" (1998)

Extensive lecture notes and chapters from other main sources.

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.

Solving a large number of homework problems. Designing some (1 or 2) problems of his/her own. Provide an annotated, extended solution to these problems and present it to the class.

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.