IF2651 Quantum Electronics 7.5 credits

Kvantelektronik

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

Establishment

Course syllabus for IF2651 valid from Autumn 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Physics

Specific prerequisites

The course is designed for students having followed introductory courses in Optics and Electromagnetic Field Theory (see e.g. topics in IO2651 Optics)_.

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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 to give the students a basis in modern quantum electronics, ranging from the interaction of light and matter to its application in linear and nonlinear optical systems.

After the course the students should be able to:

- Understand the nature of light and the mechanisms of light guiding and coupling
- Understand the basis of nonlinear optics
- Apply your knowledge to describe and design optical components
- Follow the scientific literature to recognize new trends

Since there are some other courses to follow that will deal more specifically with lasers and fiber optics, the present course will not treat these issues in any great detail.

Course contents

The course will consists on lectures and exercise classes on the following topics: waveguide and coupled mode theory, optical resonators, optical coherence, light matter interactions, propagation in periodic media, photonic crystals, nonlinear optics, light modulation.

Disposition

During a typical week of studies, you are at half-time study. At the school: four hours lectures and four hours exercise classes. Additional time is spent on independent study and (totally four) home assignments.

Course literature

"Fundamentals of Photonics" Saleh & Teich, 2nd edition, ISBN-13: 978-0-471-35832-9, John Wiley & Sons

Examination

- PRO1 - Project, 2.5 credits, grading scale: P, F
- TEN1 - Examination, 5.0 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.

- PRO1: Home assignments 10 points
- TEN1: Written ’closed book’ examination 20 points

Other requirements for final grade

- PRO1: home assignments, max 10 points, 50% needed to pass
- TEN1: examination, max 20 points, 40% needed to pass

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.