SK2812 Photonics 7.5 credits

Fotonik

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

Establishment

Course syllabus for SK2812 valid from Spring 2017

Grading scale

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

Education cycle

Second cycle

Main field of study

Engineering Physics

Specific prerequisites

Basic knowledge on electromagnetic theory, optics, and solid-state physics

Language of instruction

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

Intended learning outcomes

After the course, the students will be able to

- Explain working principles of basic photonic devices,
- Make simple calculations to quantify performances of various photonic devices,
- Choose appropriate photonic devices for achieving certain system requirements,
- Tell technological limits of several photonic devices such as solar cells, displays, LED bulbs, and describe potential solutions to those problems.

Course contents

1. Passive photonic devices
   a. Optical waveguides (incl. AWG)
   b. Resonators
   c. Photonic crystals (incl. PC fiber)
   d. Plasmonics
2. Active photonic devices
   a. Semiconductor lasers
   b. LED and Amplifiers
   c. Detectors
3. Electro-optic and optoelectronic devices
   a. Modulators
   b. Optoelectronic integration
   c. Solar cell
   d. Digital imaging and display
   e. Photonics in lighting

Course literature

Compendium based on various sources

Examination

- INL1 - Assignments, 3.5 credits, grading scale: P, F
- TEN1 - Exam, 4.0 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.

Other requirements for final grade

To pass the course, one should

- attend lab sessions and submit lab reports with an acceptable quality;
- present (and listen) in student seminar with an acceptable depth in the subject;
- attain at least 50% points in the final written examination (The written exam has in total 24 points, 8 points for each of the three subject areas. A student should attain a minimum of 4 points from each subject area to get a pass.).

Form of exam: open book (lecture notes in printed or written form, and calculators, are allowed).

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.