



# FSK3403 Photonics 7.5 credits

## Fotonik

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 FSK3403 valid from Autumn 2019

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

Enrolled as a PhD student

## Language of instruction

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

## Intended learning outcomes

After completing the course, the student should be able to

- explain the physical principles underlying the generation, transmission, manipulation and detection of light in photonic devices.

- choose, derive and apply suitable models to predict and analyze the response of basic photonic components
- perform optical measurements through hands-on work in a photonic lab.
- analyze and present data acquired using lab instruments and generated by simulations.
- critically analyze and solve practical and theoretical problems within the field of photonics with the aid of relevant literature
- provide an overview of the most recent developments of photonics and deeper insights into aspects of photonic science and applications of particular relevance for her/his own research field.

## Course contents

The course covers the physical principles underlying the operation of basic photonic components such as lasers, modulators, optical fibers and detectors and involving the generation, transmission, manipulation and detection of light. Specifically, the course covers the following topics:

- Electromagnetic optics
- Beam optics
- Guided-wave optics
- Coupled mode theory
- Optics of periodic systems
- Resonator optics
- Acousto-optics
- Electro-optics
- Nonlinear optics
- Ultrafast optics
- Generation and detection of light

## Examination

- INL1 - Home assignment tasks, 2.5 credits, grading scale: P, F
- LAB1 - Laboratory exercises, 1.0 credits, grading scale: P, F
- SEM1 - Seminar, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 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.

## Other requirements for final grade

To pass the course students should pass a final written exam (TEN1; 2 hp), and successfully complete the home assignment (INL1; 2 hp), seminar (SEM1; 2hp) and lab (LAB1; 1,5 hp) tasks.

## 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.