

SYLLABUS

Optics and photonics 7.5 credits F0048T

Optik och fotonik

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2021-02-17**

Optics and photonics 7.5 credits F0048T

Optik och fotonik

First cycle, F0048T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Experimentell mekanik	Engineering Physics

Main field of study

Engineering Physics and Electrical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and 30hp Applied Mathematics and 20hp Physics at the basic university level.

Selection

The selection is based on 1-165 credits.

Course Aim

The overall aim of the course is to give students a fundamental understanding of waveoptics, photonic components and skills to construct and analyze optical systems.

After passing the course students should have fundamental knowledge on:

Knowledge and comprehension

- Propagation of light in different media
- Interaction between photons and media fotoner och media
- Principles of photonic components

Skills and ability

After passing the course students should be able to:

- design and analyze optical systems
- use numerical tool to design and scale optical components
- plan and execute experiments with optical systems and component

Contents

- Geometrical optics
- Wave and beam optics
- Electromagnetic optics
- Optical waveguides
- Resonator optics
- Photon optics
- Photon-matter interaction
- Laser amplifiers and lasers

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The main part of the course is theoretical and composes of lectures and exercises in form of video recordings and lectures. Computer exercises, where the students use the software Matlab, will consolidate the theoretical knowledge of the course content. A practical laboratory exercise and ray tracing via the software Winlens gives skills to design and build an optical system. Writing of a report gives the opportunity to formulate the gained knowledge in a structured way. In order to acquire the aims of the course the student shall participate and execute all parts of the course, read the corresponding course literature and actively calculate the suggested exercises.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The theoretical part of the course is examined through a written exam (4,5 Credits) the practical part of the course is examined through a written report on the mandatory laboratory exercise and the Ray tracing exercise (1,5 Credits) and through the computer exercise hand ins (1,5 Credits)

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0004	Assignment report	U G#	1.5	Mandatory	A15	
0005	Computer exercises	U G#	1.5	Mandatory	A15	
0006	Written exam	G U 3 4 5	4.5	Mandatory	A21	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Head Faculty Programme Director Niklas Lehto 2021-02-17

Syllabus established

Kursplanen är fastställd av Institutionen för tillämpad fysik, maskin- och materialteknik 2008-12-15 att gälla från H09.