LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Optik och optisk design
Optics and Optical Design

FAFF01, 7,5 credits, G2 (First Cycle)

Valid for: 2023/24
Faculty: Faculty of Engineering, LTH
Decided by: PLED N
Date of Decision: 2023-04-17

General Information

Main field: Photonics.
Compulsory for: MFOT1
Elective for: BME4-bf, E4-fh, F4, F4-f, F4-axn, N4
Language of instruction: The course will be given in English

Aim

The course aims at providing knowledge about the basic principles of optics and practical knowledge on optical design, with the help of a ray tracing program.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- have a good knowledge of optics that allows him/her to design and build industrial optical applications.
- be able to understand why and when a given optical problem can be solved with ray optics, wave optics or electromagnetic optics.
- be able to understand important concepts such as polarization, diffraction, interferometry, holography.

Competences and skills
For a passing grade the student must

- be able to do alignments and measurements in optics.
- be able to calculate propagation of light through optical components.
- be able to perform optical designs.

- be able to search and acquire knowledge from references within the field.
- have an increased competence in presenting in writing and orally an accomplished project.

Judgement and approach
For a passing grade the student must

have an increased experience of working in groups of two or four persons towards a common goal.

Contents

- Ray optics, including matrix-formulation
- Wave optics
- Fourier Optics
- Electromagnetic optics
- Polarization
- Optics of layered media and photonic crystals

Three laboratory exercises: Interferometry, Fourier optics and Polarization.

A project with ray tracing.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: Written exam. Mandatory laboratory exercises with report. Ray tracing project with oral and written report.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: Basic physics and mathematics.
The number of participants is limited to: No

Reading list

- Fundamental of Photonics.
- B. E. A. Saleh and M. C. Teich.
- Wiley Series in Pure and Applied Optics, John Wiley & sons, inc. Second or third edition.
- Chap 1,2,4,5,6.

Contact and other information

Course coordinator: Cord Arnold, cord.arnold@fysik.lth.se
Teacher: Olle Lundh, Olle.lundh@fysik.lth.se
Course homepage:
http://www.atomic.physics.lu.se/education/elective-courses/faff01-fyst43-optics-and-optical-design/

Further information: It is mandatory to attend the first lecture in order to be admitted to the course.