Course syllabus

Fotonik
Photonics

FAFA60, 5 credits, G1 (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: Technology.
Compulsory for: D1
Language of instruction: The course will be given in Swedish

Aim

The course will give a basic understanding of photonics, including optics and signal transfer by light- and radio waves. Many of the concepts introduced are of importance for a deeper understanding of contemporary technology areas, e.g. data communication. The course should also give training in scientific problem-solving techniques and physical modeling, as well as written communication.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- have a basic understanding of optics,
- understand how photonics is applied in the area of signal transfer and communication,
- and be able to analyze problems and perform and interpret calculations within the area of photonics.

Competences and skills
For a passing grade the student must

- be able to interpret and use models within the area of photonics,
- have skills in handling of basic optical systems, detectors and light sourses,

- and be able to write well structured reports in which experimental data are presented and analyzed.

Judgement and approach
For a passing grade the student must

- be able to evaluate experimental methods used in the course,
- be able to search for and use information on every day physical fenomenon relevant to optics,
- and have improved ability to evaluate the applicability and limitations of physical models within the subjects of the course.

Contents

Optics and electromagnetic waves, refraction, reflection, interfernce and diffraction. Geometric optics. Resolution. Optical fibers, light sources and detectors.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: Passed written exam and laboratory exercises.

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.

Parts
Code: 0116. **Name:** Photonics.
Credits: 4. **Grading scale:** TH. **Assessment:** Written examination.
Code: 0216. **Name:** Laboratory Exercises.
Credits: 1. **Grading scale:** UG. **Assessment:** Mandatory. Active participation in laboratory work. Passed written report. **Contents:** Laboratory work: Geometrical Optics; Light diffraction and interference of light.

Admission

Assumed prior knowledge: Basic university mathematics.
The number of participants is limited to: No
The course overlaps following course/s: FAFF40, FAFF25, FAF260, FAFA01, FAFA05, FAFA50, FAFA65, FAFF30

Reading list

- Jönsson G.: Våglära och optik. 2015, ISBN: 9789163781445.
- G. Jönsson och E. Nilsson: Tillämpad Atomfysik. 2011, ISBN: 9789163798276.
- J. Crisp och B. Elliott: Introduction to Fiber Optics,. 2005.

Contact and other information

Course coordinator: Adam Kinos, adam.kinos@fysik.lth.se
Course homepage: http://www.atomic.physics.lu.se/education/mandatory-courses/faff25/
Further information: It is mandatory to attend the first lecture in order to be admitted to the course. Some elements may be taught and assessed in English. This includes a maximum of 1 hp, in the form of laboratory sessions or written assignments.