



LUNDS UNIVERSITET  
Lunds Tekniska Högskola

*Course syllabus*

## Tillämpad vågrörelselära Applied Optics and Waves

**FAFA80, 6 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: M1

Language of instruction: The course will be given in Swedish

### Aim

The aim of this course is for the student to acquire a fundamental knowledge of applied waves and optics. A good understanding of these parts of physics is essential for concept-building within rapidly developing areas of technology.

The course will also train the students ability of problem solving, modelling, experimental work and written as well as oral communication. The course is also aiming at stimulating the student to apply physics in explaining everyday phenomena.

### Learning outcomes

*Knowledge and understanding*

For a passing grade the student must

- be able to analyze problems and perform and interpret calculations within the area of knowledge.
- understand how mathematical models, analogies and pictures interact with experiments and reality.
- be able to explain everyday phenomena using correct concepts and a physics language.

*Competences and skills*

For a passing grade the student must

- be able to use and interpret models.
- be able to apply the experimental methods presented in the course.
- be able to write a well structured project report in which experimental data are presented and analyzed.
- be able to perform oral presentations and participate in discussions.
- be able to search for and use relevant information within the area of knowledge.

### *Judgement and approach*

For a passing grade the student must

- be able to evaluate experimental methods used in the course.
- be able to evaluate results of different experimental methods.

## Contents

It is important that the student understands how different parts of the course relate to each other and to rapidly developing areas of technology. The laboratory work is essential for visualizing important concepts of physics. Some laboratory exercises may be given in English.

The course deals with the following: Mechanical waves, superposition, interference and the Doppler effect. Sound intensity level and human hearing. Simple musical instruments. Reflection of sound, applications of ultrasound. Electromagnetic waves and Huygens' principle. Geometric optics and optical instruments. Interference, diffraction and resolution. Polarization and optical activity.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** Passed laboratory work and reports. Passed written exam.

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:** 0117. **Name:** Laborations.

**Credits:** 2. **Grading scale:** UG. **Assessment:** Active participation in laboratory work. Passed written presentations. **Contents:** Laboratory work: Oscillations, Geometrical optics, Diffraction and interference of light

**Code:** 0217. **Name:** Applied Optics and Waves.

**Credits:** 4. **Grading scale:** TH. **Assessment:** Written examination. **Contents:** The course deals with the following: Mechanical waves, superposition, interference and the Doppler effect. Sound intensity level and human hearing. Simple musical instruments. Reflection of sound, applications of ultrasound. Electromagnetic waves and Huygens' principle. Geometric optics and optical instruments. Interference, diffraction and resolution. Polarization and optical activity.

## Admission

**Assumed prior knowledge:** Basic courses in mathematics.

**The number of participants is limited to:** No

**The course overlaps following course/s:** FAF260, FAFA01, FAFA05, FAFA50, FAFF25, FAFA65, FAFA60, FAFF30, FAFF40

## Reading list

- Jönsson, G.: Våglära och optik. Teach Support. ISBN: 9789163943492.
- Laborationshandledning för M.

## Contact and other information

**Course coordinator:** Claes-Göran Wahlström, [claes-goran.wahlstrom@fysik.lth.se](mailto:claes-goran.wahlstrom@fysik.lth.se)

**Course homepage:** [http://www.atomic.physics.lu.se/education/mandatory\\_courses/fafa80](http://www.atomic.physics.lu.se/education/mandatory_courses/fafa80)

**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.