Linnæus University

Jnr: 2017/6585-3.1.2.2

Course syllabus

Faculty of Technology
Department of Physics and Electrical Engineering

1FY803 Vågrörelselära och optik, 7,5 högskolepoäng
Waves and Optics, 7.5 credits

Main field of study
Physics

Subject Group
Physics

Level of classification
First Level

Progression
G1N

Date of Ratification
Approved 2009-08-11
Revised 2017-11-13 by Faculty of Technology. Removal of ECTS-grading scale.
The course syllabus is valid from spring semester 2018

Prerequisites
General entry requirements and Physics B, Mathematics D. (Field-specific entry requirement 8 with the exception of Chemistry A).

Objectives

The students are expected:

- basic knowledge and concepts in Wave theory and Optics and a foundation for further studies in Physics
- analytics including data analysis, error estimation and numerical simulation
- basic knowledge of experimental methodology and experience from planning experiments
- understanding the importance of measurement and observation and the different roles that theory and experiments have in Physics
- basic skills in problem solving using both Mathematical tools and Computer simulation
- trained their skills of working in a group and ability to communicate extensively in writing and oral presentation.

Content

- Wave motion: oscillations, harmonic oscillation, transversal and longitudinal waves, energy of waves, propagation velocity, superposition, reflection, refraction, interference and diffraction
- Sound: sound pressure, sound intensity, interference, Doppler effect and ultrasonic speed, overtones and sound spectra
- light as an electromagnetic wave: Young's experiment, interference patterns, diffraction in single and double slits, gratings, resolution, and spectra
- Optics: image formation by plane and spherical mirrors, Snell's law, image formation in lenses, lens formulas, optical instruments, lens corrections
- Laboratory work: experimental methods for determining velocity, methods for determining focal distance, comparison of the accuracy of different methods.

Type of Instruction

The teaching consists of lectures, problem solving exercises, laboratory measurements and tutorials. Participation in the laboratory work is obligatory. Teaching may also include elements of training in transferable skills adapted to the student´s orientation of study.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).
Written and/or oral exam.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

Required Reading and Additional Study Material

Required reading
Hewitt, P G, *Conceptual Physics*, Pearson 2012. Pages 142 (740).

Alternative literature
Young, HD and Freedman RA, University Physics, 2012.Pages 250 (1600).