



**Karolinska  
Institutet**

Course syllabus for

## **Physical Optics, 4.5 credits**

Fysikalisk optik, 4.5 hp

This course syllabus is valid from autumn 2012.

Course code	1OP054
Course name	Physical Optics
Credits	4.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Optometry
Level	G1 - First cycle 1
Grading scale	Fail (U), pass (G) or pass with distinction (VG)
Department	Department of Clinical Neuroscience
Decided by	Programnämnd 8
Decision date	2012-05-08
Revised by	Education committee CNS
Last revision	2020-04-01
Course syllabus valid from	Autumn 2012

## **Objectives**

The course aims to provide basic knowledge about phenomena and fields within optics related to the wave nature of the light, needed in further optician education and professional work. On completion of the course, the student should independently be able to:

- account for basic wave concepts and the relevance of the wave length of light to the eye's experience of colour
- choose and calculate appropriate photometric units in order to determine levels of light in technical lighting systems.
- explain the meaning of various wave length dependent characteristics of materials
- account to and apply the concepts of polarisation, interference and diffraction in situations that are relevant to the eye and the visual system
- discuss and analyse the resolution in aberration free optical systems.

## **Content**

The course is divided in two (2) part:

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### **Physical optics, 3.5 hp**

Grading scale: VU

Wave concepts, sources of light and laser. Photometry and the space angle concept. Contrast and colour. Dispersion, selective absorption, polarisation and birefringence. Coherence, interference, interferometric methods of measurement, thin-film interference and anti-reflex treatment. Fresnel and Fraunhofer diffraction. Diffraction in reproducing systems and resolution limit.

## **Lab experiments, 1.0 hp**

Grading scale: GU

Practical laboratory assignments in physical optics.

## **Teaching methods**

The teaching is given in the form of lectures interleaved with calculation exercises and assisted problem solving where the theoretical knowledge is illustrated and practiced individually through calculation examples. The course also comprises laboratory sessions that aim at an increased understanding of the optics through practical assignments.

## **Examination**

The part Physical optics is examined through written examination. The grading scale Fail/Pass/Pass with distinction. The part Lab experiments is examined based on submitted laboratory assignments. Grading system Fail/Pass.

In case of a Pass grade in the part Physical optics, and in the part Lab experiments, the whole course is graded with a Pass. A Pass with distinction in the part Physical optics, and a Pass in the part Lab experiments, result in a Pass with distinction in the entire course.

Compulsory attendance at laboratory sessions. In case of absence, measures are discussed with the course director.

Criteria for the evaluation of the parts of the course are stated in a separate document.

Limited number of examinations or practical training sessions:

Students who have not passed the regular examination are entitled to participate in five more examinations. If the student has failed six examinations/tests, no additional examination or new admission is provided. The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination for which the student registered but not participated in, will not be counted as an examination.

## **Transitional provisions**

The course has been cancelled and was offered for the last time in the fall semester of 2018. Last examination according to this syllabus will be provided the fall semester of 2021 for students who have not completed the course.

## **Other directives**

Course evaluation will be carried out in accordance with the guidelines established by the Board of Education.

The course is given in cooperation with the department of Applied physics, section of Biomedical physics and X-ray physics at the Royal Institute of Technology (KTH).

The teaching language is Swedish but parts of the course may be given in English.

## Literature and other teaching aids

*Freeman, Michael Harold*

### **Optics**

*Hull, C. C.; Charman, W. N.*

11. ed. : Oxford : Butterworth-Heinemann, 2003 - 563 s.

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