



LUND
UNIVERSITY

Faculty of Science

FYST50, Physics: Optoelectronics and Optical Communications, 7.5 credits

*Fysik: Optoelektronik och optisk kommunikation, 7,5
högskolepoäng*

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2015-03-20 to be valid from 2015-03-20, spring semester 2015.

General Information

The course is included in the main field of study physics at the faculty of natural sciences. The course is an elective course for second-cycle studies for a scientific candidate- or Master's degree (120 credits) in physics.

Language of instruction: English

Main field of studies

Physics

Depth of study relative to the degree requirements

A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The course will provide a platform both for the selection of suitable devices for various applications in optoelectronics and optical communication and for the development of next generation devices. To achieve this, the course will emphasise the underlying physics as well as how performance is affected by device design and materials properties.

Knowledge and understanding

To pass the course, the student should be able to

- explain how light and electrons interact in semiconductors

- explain concepts such as energy quantisation and microcavities
- explain design and the resulting function of various types of light-emitting diodes, diode lasers, detectors and camera chips
- explain how light propagates in waveguides and optical fibres
- explain the principles of fibre optical components for optical communication.

Competence and skills

To pass the course, the student should be able to

- select appropriate light sources, light guiding systems and detectors for various optoelectronic applications
- calculate the performance of optical detectors and fibre optical components
- assimilate and integrate knowledge from scientific literature in the field.

Course content

- Optical processes in semiconductors, materials properties, charge carrier dynamics
- Wave guide optics, fibre optics and optical communication
- Quantum structures and microcavities
- Light emitting devices: light-emitting diodes and laser diodes.
- Light-absorbing devices: detectors, camera chips and solar cells.

Course design

The teaching consists of lectures, laboratory sessions and exercises Participation in laboratory sessions and other teaching integrated with that, is mandatory.

Assessment

Written examination at the end of the course.

Students who do not pass the regular exam are offered a new possibility shortly after the regular exam.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

To pass the course, approved examination and approved laboratory reports and participation in all compulsory parts are required.

The final grade is decided by the written examination.

Entry requirements

For admission to the course, FYSC01 Physics 3, Quantum Physics, 30 credits, or the equivalent and English 6/English B is required

Subcourses in FYST50, Physics: Optoelectronics and Optical Communications

Applies from H16

- 1511 Exam, 6,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1512 Laboratory Exercises, 1,0 hp
Grading scale: Fail, Pass

Applies from V15

- 1501 Optoelectronics and Optical Communications, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction