Faculty of Science

FYSN14, Physics: Lasers, 7.5 credits

Fysik: Lasrar, 7,5 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-03-01 to be valid from 2007-07-01, autumn semester 2007.

General Information

The course is an elective course for second-cycle studies for a scientific candidate - or Master's degree (120 credits).

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Physics	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

Knowledge and understanding

On completion of the course, the student should:

- Describe how a laser functions
- Be able to account for important concepts such as stimulated absorption and emission, homogeneous and inhomogeneous line broadening, diffraction, propagation of electromagnetic waves in a cavity, dispersion, amplification and modelocking.
- be able to discuss the different lasers that can be used for a certain application

Skills and abilities

To pass the course, the student should

- be able to make adjustments and measurements on different lasers
- know how to calculate the conditions for laser action and amplification and propagation of laser beams through different optical components.
- be able to solve problems within optics and lasers

Judgement and approach

To pass the course, the student should:

- be able to find, integrate and evaluate knowledge from extensive English reading lists.
- be able to make written presentations of the projects that they have carried out.
- work in groups of two to four persons towards a common goal.

Course content

- Beam optics, Gaussian beams, propagation through optical components
- Resonator optics
- Photons and atoms
- Laser amplifiers
- Lasers

Course design

The teaching consists of lectures/laboratory sessions/group work. Participation in laboratory sessions and connected teaching is compulsory.

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, the student must pass the written examination, the laboratory sessions and reports and have participated in all other compulsory parts.

Entry requirements

For admission to the course is required:

English B

FYSA31 Physics 3: Modern physics 30 credits or the equivalent.

Further information

This course can not be included in a higher education qualification together with the course FYSM01, if the module lasers is include in the latter course

Subcourses in FYSN14, Physics: Lasers

Applies from H16

0711 Exam, 4,5 hp
Grading scale: Fail, Pass, Pass with distinction
0712 Project, 1,0 hp
Grading scale: Fail, Pass
0713 Laboratory Exercises, 2,0 hp
Grading scale: Fail, Pass

Applies from H07

0701 Lasers, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction