Linnæus University

Course syllabus

Faculty Board of Science and Engineering

School of Computer Science, Physics and Mathematics

GI7633 Inriktning Fysik för senare skolår och gymnasiet, 90 högskolepoäng

GI7633 Orientation in Physics Intended for Secondary School and Upper Secondary School, 90 credits

Main field of study
Physics

Subject Group
Physics

Level of classification
First Level

Progression
GXX

Date of Ratification
Approved 2009-12-01
Revised 2010-08-18 by School of Computer Science, Physics and Mathematics.
Revision made for English translation of the syllabus and course evaluation.
The course syllabus is valid from spring semester 2011

Prerequisites
To be accepted for the course the student must be enrolled on the teacher training programme or already be a qualified teacher.

Objectives

Aims of the Course: The orientation aims to equip the student with basic knowledge and conceptual understanding of physics that will then provide a foundation for teaching physics at secondary and upper secondary school levels.
The student shall also be provided with basic knowledge of experimental methodology and acquire experience in planning experiments as well as an understanding of the importance of measurement and observation and the different rolls theory and experiment play in physics. Different theories concerning teaching, learning and evaluation are covered in the didactical part of the course. Special emphasis is given to working in groups and training in written and oral communication skills.
Activity based training is an important and necessary element in the course. Didactical theory covered in the orientation is linked to the work of the school in the activity based training. Correspondingly the problems arising from the activity based training

elements of the course are illustrated in the didactic theories that are covered. The students are given the opportunity to put their knowledge into practice. They can also document and evaluate teaching situations, examine local guidelines and problemize the pedagogical work from their observations.
The orientation comprises 75 credits in Physics and 15 credits in activity based training. All the modules in the orientation apart from the activity based training are offered as single subject courses and are possible as competence development for practising teachers.
Learning Aims: Having completed the course the student should

- have acquired good knowledge and understanding of the laws and concepts of classical physics and modern physics and be able to apply them to problem solving
- know how the items dealt with in the course are treated in secondary and upper secondary schools
- have developed proficiency in and knowledge of theoretical and practical applications of physics in society and also from a didactic perspective
- have developed the ability to present experimental research and problem solving orally and in writing both individually and in groups
- know how the teaching of physics can be organised so that a good learning climate is created for pupils with different interests, needs and gender
- have some knowledge of the field of research in the didactics of physics
- be able to examine and judge pupils' knowledge and conceptual development independently
- be familiar with the different ways of working and the different teaching methods in school.

Content

In the orientation includes the following courses: 1FY804, 1FY802, 1FY803, 1FY801, 1FY031, 1FY807, 1FY805.

Normally the following courses are also taken:
FY2032, Thermodynamics, 7.5 credits
FY2052, Mathematical Methodology of Physics, 7.5 credits
FY3013, Applied Quantum Mechanics, 7.5 credits
as well as one additional course at bachelor level.

However, these may be exchanged for other courses within the subject area. Alternative courses must offer not only a broad subject content but also sufficient experimental knowledge as well as sufficient depth (at least two courses at bachelor level). This will be decided by the examiner.

Module 1 1FY804 7.5 credits
Mechanics
For detailed information, see each course syllabus.

Module 2 1FY802 7.5 credits
Electricity and magnetism
For detailed information, see each course syllabus.

Module 3 1FY803 7.5 credits
Wave Motion and Optics
For detailed information, see each course syllabus.

Module 4 1FY801 7.5 credits
Atomic and Nuclear Physics
For detailed information, see each course syllabus.

Module 5 1FY031 15 credits
Activity Based Training in Physics for Secondary and Upper Secondary School
For detailed information, see each course syllabus.

Module 6 1FY807 7.5 credits
Quantum Mechanics
For detailed information, see each course syllabus.

Module 7 1FY805 7.5 credits
Physics of Solid States I with Particle Physics
For detailed information, see each course syllabus.

Type of Instruction
Teaching is conducted in the form of lectures, laboratory work, seminars and activity based training sessions. Attendence is obligatory for seminars, laboratory work as well as activity based training sessions.

Examination
The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

A translation of the grade to the ECTS-scale may be obtained upon request. The request for a translation should be made before the final grade for the course is awarded.

The methods of examination that may be used include oral and written examinations as well as oral and written presentations of obligatory tasks. Both individual presentations and group presentations are used. The main type of examination is decided at the beginning of the course.
The activity based training is assessed by the ability shown to put knowledge into action according to the aims of the pupils and the school, examinations, as well as presentation of the examined activity based training tasks.
The trainee-teacher’s professional attitude is assessed in consultation with a practising qualified teacher.

Course Evaluation
A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Other
Students who do not pass the activity based training will be offered one further examination chance. Whether a further study visit is necessary is decided in consultation with the student. Any possible cost involved is the responsibility of the student.
Having completed the training the student will receive a degree certificate upon request from the Graduation Office at the
Division of Student Affairs.

Required Reading and Additional Study Material
Required Reading
Specified in each module.