Linnæus University

Jnr: 2015/1650-3.1.2

Course syllabus

Faculty of Technology
Department of Physics and Electrical Engineering

4FY513 Tillämpad elektromagnetisk fältteori, 7,5 högskolepoäng
Applied Electromagnetic Field Theory, 7.5 credits

Main field of study
Physics

Subject Group
Physics

Level of classification
Second Level

Progression
A1N

Date of Ratification
Approved by Faculty of Technology 2015-05-22
The course syllabus is valid from spring semester 2016

Prerequisites
Electromagnetic Field Theory (2FY810) 7.5 credits or Antenna technology (2ED083), 7.5 credits or the equivalent.

Objectives
Upon completion of the course, the students should have:

- a deeper knowledge of electromagnetic field theory
- a knowledge of the use of mathematics and simulation as tools in problem solving and model building in electromagnetic field theory
- an understanding of the importance of measurement and observation, the roles played by experiment and theory in physics.

Content
The course contents is:

- Boundary value problems in electrostatics.
- Electrical and magnetic properties of materials, polarization, dielectric materials, dia-, para-, and ferro-magnetic material, magnetic dipoles, vector potential.
- Energy and momentum of the electromagnetic field and their conservation laws, force and torque on electric and magnetic dipoles.
- Maxwell's equations, time-dependent fields and radiation, dynamics of charged particles
- Wave-guides
- Lorentz invariant description.

Type of Instruction
The teaching consists of lectures, problem solving exercises, computer simulations and laboratory work. Participation in the laboratory work and simulations is mandatory.

Examination
The course is assessed with the grades A, B, C, D, E, Fx or F.
The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

Assessment of the student´s performance is made through written or oral tests and consist of theoretical questions or problems to solve.
The student has to write reports on laboratory work carried out. These reports are graded.
Students who do not pass the regular examination are given the opportunity to do a resit examination shortly after the regular examination

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.

Credit Overlap
This course cannot be part of a degree in combination with another course in which the content fully or partly correspond to the content of this course: 4FY813 Applied Electromagnetic Field Theory, 7.5 credits

Other
Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material
Required reading
David K Cheng, Field and Wave Electromagnetics (2nd Edition), Addison-Wesley. UK 1989. 717 pages.