SYLLABUS

Waves, plasmas and antennas 7.5 credits F7002T

Vågor, plasmor och antenner

Course syllabus admitted: Autumn 2007 Sp 1 - Spring 2009 Sp 4

DECISION

The syllabus was established by the Department of Applied Physics and Mechanical Engineering 2007-02-28, and remains valid from autumn 2007.

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LULEÅ TEKNISKA UNIVERSITET

Waves, plasmas and antennas 7.5 credits F7002T

Vågor, plasmor och antenner

Second cycle, F7002T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5		Physics

Entry requirements

Mathematics1-4 for civilingenjörer and Linear analysis MAM243. Elektromagnetic field theory MTF105.

Selection

The selection is based on 30-285 credits

Examiner

Hans O Åkerstedt

Course Aim

After the course the student:
- should know how to formulate and solve electrostatic and magnetostatic problems in complicated geometry using the software multiphysics.
- should know how to analyse the propagation of electromagnetic waves in vacuum, dielectric and metallic materials.
- should know the properties of a plasma.
- should know how to analyse the motion of charged particles in homogenous and inhomogenous magnetic fields.
- should know about the concept of adiabatic inavariant.
- should know how to formulate the magnetohydrodynamic equations and analyse MHD waves in homogenous magnetic fields.
- should know how to analyse transmission lines and the radiation fields from simple antennas.
- should know how to construct and measure the properties of antennas

Contents

Electromagnetic Fields: Maxwells equations. Plane waves.
Plasma Physics: Particle motion in external fields. MHD. Waves in plasmas.
Antenna theory: The radiation field from a source. Multipole expansion ot the radiation field, dipole and quadrupole antennas.
Antenna construction: Construction and measurement of handmade antennas.

Realization

Lectures, classroom teaching, home assignments and laboratory work

Examination

Written examination and laboratory work.

Overlap

The course F7002T is equal to MTF108

Literature. Valid from Autumn 2007 Sp 1

F.Chen: Introduction to plasma physics and controlled nuclear fusion. Plenum press
Matthew N. O Sadiku: Elements of electromagnetics. Oxford Univeristy Press

Course offered by

Department of Applied Physics and Mechanical Engineering

Items/credits

Number	Type	Credits	Grade
0001	Written exam	6	6 U G VG 3 4 5
0002	Laboratory work	1.5	U G#

Syllabus established

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