EQ2420 Antenna Theory 7.5 credits

Antennteori

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for EQ2420 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course, the student should:

- have knowledge of the different parameters and properties used to characterize antennas.
- be able to make theoretical calculations of fundamental antenna elements such as dipoles and aperture antennas.
- be able to use commercially available program for antenna simulation.
- have knowledge of some antenna systems and the demands of such on the antenna components.

Course contents

Introduction – Examples of antenna systems, radiation patterns, directivity, polarization, antenna impedance, effective area, Friis' equation, the radar equation, antenna temperature and noise.
Antenna radiation – the antenna as a source of radiation, duality and reciprocity, near- and far-field form a dipole, image theory, mutual coupling. Aperture antennas and Babinet's principle, microstrip antennas. Linear and planar antenna arrays, synthesis of radiation patterns.

Physical limits – Super directivity, bandwidth vs. size, mutual resistance and correlation.
Practical design – High gain, conformal, low frequency, and terminal antennas.
System aspects – Radar, radar cross-section of antennas, radio propagation, link budget, fading space and polarization diversity. Cellular and sector systems, adaptive and multi-beam antennas.

Course literature

Balanis: Antenna Theory.

Lecture notes from the department

Examination

- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

One written examination (TEN1; 3,5 cr.).
Three home assignments (LAB1-3; 1,5 cr.).

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.