DN2274 Computational Electromagnetics 7.5 credits

Elektromagnetiska beräkningar

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 DN2274 valid from Autumn 2008

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

Language of instruction

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

Intended learning outcomes

The aim of the course is to give the students knowledge of numerical solution of electromagnetic wave problems, relevant mathematical theory, and some insight into industrial application domains, as well as pros and cons of different formulations and software approaches.

After successful completion of course requirements, the students will be able to

- understand limitations of and independently apply standard methods for electromagnetic wave propagation;
- contribute to development of new methods and software for finite difference and finite element differential equation models as well as integral equation models for frequency domain models:
- use commercial application software with insight into fundamental properties and limitations
- be educated novices in application of techniques for high-frequency Asymptotics.

Course contents

The Maxwell equations.

Time-domain methods: finite differences and finite elements.

Frequency-domain methods: The method of moments, finite elements.

High frequency methods: Geometrical optics, diffraction and multipole methods. Areas of application.

Course literature

Material from A Taflove: Computational electrodynamics, Artec House, A. Peterson, S. Ray, R. Mittra: Computational methods for electromagnetics, IEEE Press and lecture notes available at the department.

Examination

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

Examination (TEN1; 3 university credits).
Problem solving assignments (LAB1; 4,5 university credits).

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.