HE1008 Analogue Technology 7.5 credits

Analogteknik

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

Establishment

Course syllabus for HE1008 valid from Autumn 2007

Grading scale

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

Education cycle

First cycle

Main field of study

Electrical Engineering, Technology

Specific prerequisites

Basic knowledge in mathematics (algebra, matrices, equation systems, differential equations, and complex numbers).

Language of instruction

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

Intended learning outcomes

The main objective is to provide knowledge of electrical components and their interaction in electrical networks, knowledge of some methods for calculating the dependence of time and frequency for electrical circuits. The course will also provide knowledge about electrical instruments and common methods for measuring and training in using computer aid for simulating and measuring in electrical circuits.

After passing the course you should be able to:

- apply basic electrical network theory in order to calculate direct current networks as well as alternate current networks
- explain the characteristics and uses of passive components
- calculate the time constant and compute its effect in capacitive and inductive circuits, especially at closing and opening in DC networks
- use programs for circuit simulation for any electrical circuit and simulate its function with respect to currents, voltages, pulse respons, frequency respons and time dependence
- explain the function of the ideal operational amplifier, and analyze of basic circuits with operational amplifiers
- explain the function and performance of electronic instruments
- handle electrical generators and measuring instruments such as voltage sources, function generators, multi meters and oscilloscopes

Course contents

- Direct current and alternating current, voltage and power.
- Ohm's and Kirchhoff's laws.
- Nodal analysis and superposition
- Passive components
- Thevenin theorem
- Electrical fields and the capacitor.
- Magnetic fields, induction, inductor and transformer.
- Computation of alternating current using complex numbers
- Linear systems with differential equations
- Transient behaviour at opening and closing in circuits with capacitors and/or inductors
- Basic knowledge of three phase systems
- Simulation of electrical circuits
- Multimeters and oscilloscopes
- Operational amplifiers

Course literature

Boylestad: Introductory Circuit Analyses, Prentice Hall
Text material from the department

Examination

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

- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, 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.

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

Other requirements for final grade

Passed written exam (TEN1; 4.5 cr.), grading A-F.
Passed practical exercises (LAB1; 3 cr.), grading A-F.
The final grade is based on the two parts. Grading A-F.

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.