EI1120 Electrical Circuit Analysis for the Environment and Energy Program 7.5 credits

Elkretsanalys för energi och miljö

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

On 15/10/2019, the Dean of the EECS school has decided to establish this official course syllabus to apply from spring term 2020 (registration number J-2019-0588).

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Language of instruction

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

Intended learning outcomes

After completing the course with a passing grade the student should be able to:

- apply theories and methods in circuit analysis, and reproduce basic theorems and definitions of important concepts that are described in the course content
- solve parts of problems from the major part of the course content by setting up a calculation model and solve the problem analytically choose appropriate method; make proper approximations; formulate and solve necessary equations; evaluate the result in order to solve for quantities in linear electric circuits.

For higher grades, the student should in addition be able to, with progression in both completeness and scope, solve problems from the whole course content.

Course contents

- Basic components, voltage and current sources (independent and dependent). Ohm's law and Kirchhoff's laws. Analytical methods including in stages solution through simplifying, nodal analysis, superposition and graphical methods.
- Two pole equivalents (Thevenin and Norton equivalents).
- Power transfer matching.
- Operational amplifiers.
- Capacitors and coils.
- Transient phenomena and the step function.
- Equilibrium and continuity. Time signals of circuit quantities in dynamic circuits and in filter circuits.
- Alternating current analysed with the complex phasor method.
- Complex power, active, reactive and apparent power, powerfactor.
- Inductive coupling: mutual inductance and transformers.
- Three-phase system in the balanced and unbalanced cases.
- Applications and computer calculations.

Specific prerequisites

Examination

- PRO1 - Project 1, 1.5 credits, grading scale: P, F
- PRO2 - Project 2, 1.0 credits, grading scale: P, F
- TEN1 - Examination, 5.0 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.

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.