Electric Circuits

Programme course

6 credits

Elektriska kretsar

TSTE92

Valid from: 2017 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2017-01-25

Main field of study
Electrical Engineering

Course level
First cycle

Advancement level
G1X

Course offered for
- Engineering Biology, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Calculus and linear algebra.

Intended learning outcomes
The aim of the course is:
- to give a theoretical base for analysis and synthesis of passive and active analog circuits
- to give knowledge and ability in analysis of such circuits
- to give ability in elementary amplifier design with OP-amps

- After passing the course the students should be able to:
    - compute current, voltage and power in general dc- and ac- circuits with structured methods
    - determine voltage gain for circuits with operational amplifiers

Course content
Components and elements: Resistors, capacitors, inductors. Ideal models. Voltage sources, current sources. Theory for direct current: Ohms law, Kirchhoff laws. Series and parallel connection, current and voltage divider circuits. Node-voltage analysis. Norton´s theorem. Sinusoidal steady-state analysis: Phasors. Impedance and admittance. Power. Resonance circuits. Maximum power transfer. Introduction to filters. Operational amplifiers.

Teaching and working methods

The course consists of lectures and, in connection with these, exercises and laboratory work.

Examination

UPG1	At-home assignments	4 credits	U, 3, 4, 5
LAB1	Laboratory work	2 credits	U, G

During the course, the students will hand in home assignments. There are three assignments where the last one is done in groups with two or three students in each. The assignments are marked as they are handed in. The student cannot hand in the assignment more than three times per assignment (with incremental corrections/improvements) before deadline. To obtain the grade 3, the student must have a correct answer on all the assignments on time. To obtain a higher grade, the student shall present the solutions orally and be able to answer supplementary questions from the examiner.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses: Signal- and image processing. Measurement technology.

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Jacob Wikner

Course website and other links

http://www.isy.liu.se/edu/kurs/TSTE92/

Education components

Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

Course literature

Lab-PM. Referenslitteratur: Sune Söderkvist: Kretsteori & Elektronik.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.