

Electronics

Programme course

5 credits

Elektronik

TSTE24

Valid from: 2017 Spring semester

Determined by

Board of Studies for Computer Science
and Media Technology

Date determined

2017-01-25

Main field of study

Electrical Engineering

Course level

First cycle

Advancement level

G1X

Course offered for

- Computer Science and Engineering, 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

Basic mathematics as algebra, calculations with complex numbers, and equation solving. Basic knowledge in programming in Python

Intended learning outcomes

The aim of the course is:

- to provide a theoretical base for analysis and synthesis of passive and active analog circuits

- to provide knowledge and skills in analysis of analog circuits
- to provide skills in basic electronics design

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 small signal input and output resistance and voltage gain for a given amplifier

- determine voltage gain for circuits with operational amplifiers
- use computer tools to analyse analog circuits
- verify that a design reach the requirements
- fullfil a simple design task from specification to design in hardware

Course content

Components and their models: Resistors, capacitors, inductors, diodes, and transistors. Voltage and current sources. DC theory: Ohm's law. Kirchhoff's laws. Series- and parallel circuits. Voltage and current divider circuits. Nodal analysis. Superposition. Thévenin and Norton's theorems. Sinusoidal steady-state analysis: Phasors, impedance and admittance. Power. Resonance circuits. Maximum power. Introduction to filters. Use of transistors for switching and amplifying. Amplifiers: Quiescent point analysis and signal analysis for common amplifier stages. Operational amplifiers.

Teaching and working methods

The course consists of lectures, lessons and laboratory works. A design problem should be solved and validated in the lab. The course runs over the entire spring semester.

Examination

UPG1	Lab examination	3.5 credits	U, 3, 4, 5
LAB1	Laboratory works	1.5 credits	U, G

Grades are given as 'Fail' or 'Pass'

Grades

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

Other information

Supplementary courses: Analog konstruktion, Signaler och system, Analoga och tidsdiskreta integrerade kretsar

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Mark Vesterbacka

Education components

Preliminary scheduled hours: 58 h

Recommended self-study hours: 75 h

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://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.