

Circuit Theory and Transform Methods

Programme course

10 credits

Kretsteori och transformmetoder

TSEI11

Valid from: 2017 Spring semester

Determined by

Board of Studies for Electrical
Engineering, Physics and Mathematics

Date determined

2017-01-25

Main field of study

Electrical Engineering

Course level

First cycle

Advancement level

G1X

Course offered for

- Engineering Electronics, B Sc in Engineering
- Computer Engineering, B 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 purpose of the course is to give proficiency to analyse, and to a certain extent, design electrical circuits, consisting of linear passive components. The course shall give directly applicable knowledge and be preparatory for other courses as well.

After completing the course you should be able to:

- analyze and perform measurements on DC and AC circuits
- use transforms to solve differential equations and circuit problems
- analyze and verify measurements on simple filters.

Course content

DC theory and AC theory with the complex method. Periodic signals, Fourier series on complex and trigonometric form. Mean value and power. Impulse and step response, sinc function. Fourier transform, magnitude, phase, and energy spectrum. System of differential equations, Laplace transform, convergence region. Transfer function, poles and zeros, stability and causality. Introduction to continuous-time filters.

Teaching and working methods

The course is organised in lectures, lessons and laboratory work.
The course runs the entire spring semester.

Examination

KTR1	Optional test	0 credits	U, G
LAB1	Laboratory assignments	2 credits	U, G
TEN1	A written examination	8 credits	U, 3, 4, 5

A pass on the optional test gives a bonus on the written examination (TEN1). The bonus is valid 12 months from the date of passing.

Grades

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

Other information

Supplementary courses: Linear Systems, Automatic Control, Telecommunication, Filters, Analog Electronic Circuits, Electrical Engineering

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Mark Vesterbacka

Course website and other links

<http://www.isy.liu.se/en/edu/kurs/>

Education components

Preliminary scheduled hours: 78 h

Recommended self-study hours: 189 h

Course literature

Additional literature

Books

Söderkvist, S., *Formler och tabeller*.

Söderkvist, S., *Kretsteori, Från alpha till omega, övningsbok*.

Söderkvist, S., *Kretsteori, Från alpha till omega*.

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.