

# Circuit Theory, advanced course

Programme course

4 credits

Kretsteori fk

TNE101

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

G2X

## Course offered for

- Electronics Design 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

Circuit theory, Transform theory

## Intended learning outcomes

The course will give the student knowledge in methods for the analysis of linear electric circuits in the time and frequency domains. After the course the students should be able to

- apply the complex phasor method for calculations related to and analysis of the behaviour of single- and three-phase linear electric AC circuits
- apply Fourier series, Fourier and Laplace transforms for calculations related to and analysis of the behaviour of linear electric circuits in the time and the frequency domain
- use Matlab and Simulink for the analysis and modelling of linear electric circuits
- investigate the function in the time and frequency domain of linear electric circuits with experimental methods
- integrate and be able to critically compare different methods for the analysis of linear electric circuits in the time and frequency domains

## Course content

Single phase and three phase AC. The application of Fourier series, Fourier and Laplace transforms to the theory of linear electric circuits. Stationary and transient response. Periodic and non-periodic phenomena. Circuit analysis using Matlab and Simulink. Experimental methods and modelling. System analysis and properties of systems. Time continuous signals and systems. The representation of electric circuits and signals in the time and frequency domains. Transfer function. Poles and zeros and pole-zero diagrams. Amplitude and phase characteristics. Bode diagrams.

## Teaching and working methods

Lectures and integrated labs and problem solving lessons

## Examination

LAB1	Laboratory work	2 credits	U, G
TEN1	Written examination	2 credits	U, 3, 4, 5

## Grades

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

## Department

Institutionen för teknik och naturvetenskap

## Director of Studies or equivalent

Adriana Serban

## Examiner

Jonte Bernhard

## Course website and other links

<http://www2.itn.liu.se/utbildning/kurs/>

## Education components

Preliminary scheduled hours: 32 h

Recommended self-study hours: 75 h

## Course literature

### **Additional literature**

#### **Compendia**

Jonte Bernhard, Kretsteori, fördjupning

## 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](http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).