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 ably 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 continous 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 charecteristics. 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://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.