SYLLABUS

Circuit Theory 7.5 credits E0003E

Elkretsteori

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2023-02-15

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LULEÅ TEKNISKA UNIVERSITET

Circuit Theory 7.5 credits E0003E

Elkretsteori

First cycle, E0003E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Elektroteknik	Electrical Engineering

Main field of study

Engineering Physics and Electrical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and knowledge in Mathematics; linear algebra, ordinary linear differential equations, complex numbers (M0049M Linear Algebra and Differential Equations).

Selection

The selection is based on 1-165 credits.

Course Aim

After the course, the student will be able to analyse analog linear circuits. This includes the basic knowledge of components and their constitutive relations, as well as different methods for the analysis of DC and AC circuits.

- After the course the student should possess knowledge of constitutive relations for basic electrical components and, based on that knowledge, be able to apply knowledge of mathematics to analytically solve electric circuit problems..
- The student should independently be able to analyse and evaluate analog linear circuits. This is demonstrated by laboratory experiments, simulation exercises, and through homework assignments and a written exam.
- The student should independently be able to analyse and minimise transmission losses, in particular in linear AC circuits with inductive loads, and to be able to describe the link to environmentally sound electrical power distribution and sustainable development.

Contents

- Basic knowledge and constitutive relation for electric components
  - Resistor (R), Inductor (L), Capacitor (C)
  - Ideal operation amplifier
  - Current and voltage sources
- Steady state analysis for DC and AC powered circuits.
  - Kirchhoff current and voltage laws
  - Node and mesh analysis
  - Complex method (jΩ)
  - Power calculations
- Transient analysis of DC powered circuits
- Analysis of passive (RLC) and active (RC) filters
- Simulation of circuits with OrCAD

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

The scheduled teaching consists of lectures and mandatory simulation exercises and labs in laboratory rooms. Students are expected to complete a number of mandatory exercises with support of the course material, which are reported prior to simulation/laboratory work. The course may include guest lectures by companies.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

The examination consists of two parts:

- Theoretical understanding is examined through a written exam with differentiated grades. 4.5hp (G U 3 4 5)
- Practical as well as theoretical understanding is examined through presentation of completed simulation and laboratory assignments as well as preparatory exercises of theoretical character. 3.0HP (U G#)

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Remarks

http://www.ltu.se/csee/utbildning/kurser/GU

Overlap

The course E0003E is equal to E0006E, E0012E, SME096

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Laboratory work	U G#	3	Mandatory	A07	
0003	Written exam	G U 3 4 5	4.5	Mandatory	A21	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Robert Brännström 2023-02-15

Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-02-28