

Syllabus academic year 2010/2011

(Created 2010-07-25.)

CIRCUITS AND MEASUREMENTS ETE604

Credits: 7,5. **Grading scale:** TH. **Cycle:** G1 (First Cycle). **Main field:** Technology. **Language of instruction:** The course will be given in Swedish. **ETE604 overlaps following cours/es:** ETE602 and ETE603. **Compulsory for:** IDA1, IEA1. **Course coordinator:** Rolf Björkman, rolf.bjorkman@hbg.lth.se, Dep of Regional Development and Industrial Coop. **Assessment:** Grad 3: passed written examinations, passed laboratory preparation reports, passed laboratory experiments and one passed laboratory experiment report. Higher grad through the written examinations. Final grade = interger of $(3,5 \times \text{grade part 1} + 4 \times \text{grade part 2}) / 7,5$, but not more than 5,0. **Parts:** 2. **Home page:** http://student.ch.lu.se/lth/rolf/Krets_1/.

Aim

The aim of this course is to give the students the basic knowledge about electric components and circuits. Solving problems and the laboratory works are often shown to be the results of real inventions and the answers to real needs in industry, the office and the home.

Knowledge and understanding

For a passing grade the student must

- be able to explain and use the basic electric quantities: current, voltage, resistance, impedance and power in a given electric circuit using the theoretical models described in this course
- be able to refer alternating current and voltage phasor diagram into the complex plane
- be able to present a report of a planned and executed measurement in an electric circuit.

Skills and abilities

For a passing grade the student must

- be able to calculate currents, voltages, reactances, impedances and power in a given electric circuit using the theoretical models described in this course
- be able to plan and execute measurements electric quantities in an electric circuit

- be able to analyse and explain the function and properties of a given electric circuit
- be able to explain the function of a resistor, capacitor, inductor, ideal operational amplifier and ideal transformer working in an electrical ac or dc circuit.

Contents

Part dc circuits:

- Current, voltage and resistance
- Resistor and potentiometer. Colour code
- Ohm's Law and Kirchhoff's laws
- Thévenin and Norton equivalent circuits
- Superposition
- Power in dc circuits
- The ideal operational amplifier
- Capacitor and inductor

Part ac circuits:

- Sinusoidal time dependency: The phasor diagram, complex method, impedance and admittance, apparent power, average power, reactive power
- Direct and alternating current/voltage measurements: measurement of voltage, current and resistance with the aid of the analogue and digital multimeter. Oscilloscope. The influence of the measurement instrument
- Average value, average absolute value and the effective value (RMS) of periodical signals
- The ideal transformer

Literature

Alfredsson, A & Rajput, R.K: Elkretsteori. Liber. ISBN: 978-91-47-09343-4.

Parts

Code: 0108. **Name:** Circuits and Measurements, Part 1.

Higher education credits: 3,5. **Grading scale:** UG. **Assessment:** Written examination. **Contents:** The part of the course that is about dc circuits.

Code: 0208. **Name:** Circuits and Measurements, Part 2.

Higher education credits: 4. **Grading scale:** UG. **Assessment:** Written examination. **Contents:** The part of the course that is about ac circuits.