



# MF1017 Basic Electrical Engineering 6.0 credits

## Elektroteknik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for MF1017 valid from Autumn 2019

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Technology

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

After passing the course, the student should be able to:

- Analyze, dimension and use systems that have an electrotechnical part. Examples are electromechanical and / or electrochemical systems.
- Connect circuits, perform measurements and discuss measurement results.
- Design the control of a system of the kind referred to in paragraph 1 above.

## Course contents

Electrical circuits: DC, AC and transients. Analogy between electrical and mechanical quantities.

Electrical measurements and analog circuits: Measuring with multimeter and oscilloscope. Use of LabVIEW.

Digital electronics and microcontrollers: Transistors in switched and applications. The functionality of a microprocessor and a microcontroller. Use of microcontrollers in simple applications. Examples of sensors such as encoders and strain gauges.

Electrical motordrives: Single- and three- phase systems. Theory and properties of DC machines. Principles for speedcontrol of electrical machines. Mechanical and thermal transients in electrical machines. Choice of machine size for time varying mechanical loads. Power electronics and drive units for machines. calculation of the required voltage and current for a DC-motordrive.

Sustainable development: Electric and hybrid cars. Calculation of quantities such as e.g. energy, power, force, velocity, acceleration, current and voltage in different parts of a electric or hybrid car under different conditions such as acceleration or regenerative braking. Dimension of energystorages such as batteries and capacitors (ultracap).

## Specific prerequisites

Following courses: SF1624 Algebra and Geometry, SF1626 Calculus in Several Variable and SD1120 Noise and Vibration Control, or similar.

## Course literature

Will be announced at the start of the course.

## Examination

- INL2 - Assignments, 1.5 credits, grading scale: P, F
- LAB2 - Laboratory work, 2.0 credits, grading scale: P, F
- TEN2 - Written exam, 2.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The examiner decides, in consultation with KTH's coordinator for disabilities (Funka), about possible adapted examination for students with documented, permanent disabilities. The examiner may permit other examination format for re-examination of individual students.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.