



Faculty of Health, Science and Technology
Electrical Engineering

Syllabus

Electrical Engineering for Master Students in Engineering Science

Course Code:	ELGB13
Course Title:	Electrical Engineering for Master Students in Engineering Science <i>Elteknik för civilingenjörer</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
ETA (Electrical Engineering)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2019-02-25, and is valid from the Autumn semester 2019 at Karlstad University.

Prerequisites

Registration on the course Linear Algebra, 7.5 ECTS credits, or equivalent

Learning Outcomes

Upon completion of the course, students should be able to:

- perform calculations on simple electrical networks using Ohm's law, Kirchoff's laws, and Thevenin's theorem,
- perform calculations on single-phase and three-phase alternating current circuits using phasors and the j omega method,
- perform calculations on transformers, direct current machines, and three-phase asynchronous

machines,

- give an account of the three-phase synchronous machine, and
- perform calculations on simple semiconductor circuits.

Content

The course covers the following:

Electric circuits: Calculations with Ohm's and Kirchoff's laws of series and parallel circuits, Thevenin's theorem

Single-phase and three-phase alternating current circuits: Definitions of sinusoidal voltage and currents, the use of phasors and the $j\omega$ method, Y- and D-connected three-phase systems

Power: Active, reactive, and apparent power, phase compensation

Transformers: Windings, voltage, current ratio, transformer formula

Asynchronous machines: Construction, moment, rotational speed, slip, loss, and efficiency, Y/D-connected machine

Synchronous machines: Construction, moment, rotational speed, loss, and efficiency

Direct current machines: Construction, separate and series excitation machine, moment, rotational speed, loss, and efficiency

Semiconductors and rectifiers: Semiconductors of n-type and p-type, diode, simple semiconductor circuits.

Reading List

See separate document.

Examination

Assessment is based on a written exam, mandatory laboratory sessions, and lab reports.

Grades

One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course. Engineering students are awarded one of the grades Pass with Distinction (5), Pass with Some Distinction (4), Pass (3), or Fail (U).

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.