



Faculty of Health, Science and Technology
Electrical Engineering

Syllabus

Course Approval

The syllabus was approved by the Faculty Board of Health, Science and Technology on 5 November 2013, and is valid from the Autumn semester of 2013 at Karlstad University.

Course Code: ELGA21

Electrical technology, 7.5 ECTS Credits
(Elteknik, 7.5 Swedish credit points)

Degree Level: Bachelor

Progressive Specialisation: G1F (First cycle, has less than 60 credits in first-cycle course/s as entry requirements)

Language of Instruction

Swedish

Swedish

Prerequisites

The course MAGA44

Major Field of Study

ETA (Electrical Engineering)

Learning Outcomes

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

- perform calculations of simple electrical nets using Ohm's law, Kirchoff's laws and Thévenin's theorem,
- perform calculations of single-phase and three-phase alternating current circuits using phasor diagrams and complex numbers,
- perform transformer calculations, the direct current machine and the three-phase non-synchronous machine,
- give an account of the three-phase non-synchronous machine, the servo-motor and the stepper motor,
- perform simplifications using Boolean algebra,
- give an account of basic logical functions,
- solve sequential logic circuit problems,
- program a PLC-system.

Content and Form of Instruction

The course deals with the following components:

Electrical circuits: calculation with Ohm's and Kirchoff's laws of series and parallel circuits, Thevenin's theorem
Single and three-phase alternating currents: definitions of sinusoidal voltage and currents, using phasor diagram and complex numbers, Y- and D-connected three-phase systems,
Effects: active, reactive and apparent power, phase compensation
Transformer: voltage current and winding turns ratio, transformer formula
Non-synchronous machine: design, moment, rotational speed, slip, loss and efficiency, Y and D connected

machine, frequency regulation

Synchronous machine, servo-motor, stepping motor: design, function and application areas

Direct current machine: design, separate and series magnetic circuit, moment, rotation speed, loss and efficiency

Basic logical functions, Boolean algebra simplifications, logical solutions to sequential circuits, programming of a PLC for regulating pneumatic cylinders.

Reading List

See separate document.

Examination

Assessment is in the form of a written exam, hand-in assignments, mandatory laboratory sessions and lab reports.

Grades

One of the grades Pass with Distinction (5), Pass not without Distinction (4), Pass (3) or Fail (U) is awarded in the examination of the course.

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 assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

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

Karlstads universitet 651 88 Karlstad, Sweden
Tel +46-54-700 10 00 Fax +46-54-700 14 60
information@kau.se www.kau.se