# LT1023 Programming and Electrical Engineering for Technology Teachers 7.5 credits

## Programmering och elektroteknik för tekniklärare

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 LT1023 valid from Spring 2019

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

For admission to the course, knowledge is required equivalent to:

General entry requirements for upper-secondary teacher training programme in technology.

## Language of instruction

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

## Intended learning outcomes

The general aim of the course is to equip you with basic knowledge in programming and electronics.

Concretely, this means that on completion of the course, you should be able to:

- identify and use common electric and electronic components

- carry out measurements and calculations on electric circuits

- account for how single-phase and three-phase alternating current is generated and transformed.

- connect common electric measuring instruments such as oscilloscopes to simple electric circuits.

- carry out measurements with above-mentioned instruments as well as interpret the results.

- use a micro-controller to solve simple assignments, e.g. to govern the voltage to an electric motor and to read a signal from a sensor.

- describe a system by means of a state diagram and write a programme to govern such a system.

- Account for the simple control circuit and the control concepts.

- Cancel controllers experimentally.

- Understand and explain basic concepts in programming and be able to show how they should be used in practice.

## Course contents

The course intends to give basic knowledge in programming and electrical engineering.

The programming part includes:

- Introduction to programming (via the programming language Python).

- Basic concepts as variables, data types, object orientation, functions, conditions, loops, reserved words, file management as well as object-oriented programming.

- The object-oriented part includes the concepts class, objects, instance variables and instance methods and constructors.

The electronics part includes: Kirchhoff's laws, Ohm's law. Voltage, current, charge, effect, energy, magnetic flow.

- Parallel and serial connections.

- Source management cargo, line resistance, loss in cable/management

- Transfer, transformation,

- The Control Loop, Processes, Controller and its parameters P I D

- Embedded Systems, development systems and target systems

- Programming of microcontrollers, state machines and how they are programmed with switch case.

## Course literature

Anges senast tre veckor innan kursstart.

## Examination

- INL1 - Assignments in Electrical Engineering, 1.5 credits, grading scale: P, F
- INL2 - Programming Assignments, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Assignments in Electrical Engineering, 1.5 credits, grading scale: P, F
- LAB2 - Programming Assignments, 1.5 credits, grading scale: P, 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.

## 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.