HÖGSKOLAN VÄST

COURSE SYLLABUS

Course code: **KRE600**

Power Electronics, 5 HE credits

Kraftelektronik, 5 hp

Established: 2021-03-25
Established by: Department of Engineering Science
Applies from: V22

Learning outcomes

Knowledge and understanding

The student must, after completing the course, be able to:

- show understanding of the operation and use of semiconductor components.
- analyze the operation of the commonly used power electronic converters.
- analyze the characteristics of semiconductor components and the losses in a converter.
- explain the principles of control of converters.

Competence and skills

The student must, after completing the course, be able to demonstrate skill and ability to:

- explain the operation of a converter.
- calculate the losses for a converter.
- calculate the steady state operation point of a converter.
- analyze a converter with simulation tools.

Judgement and approach

The student must, after completing the course, be able to:

- argue for the choice of converter topology and semiconductor components for a given application.

Entry requirements

Degree of Bachelor of Science in mechanical engineering or equivalent. Additionally the Bachelor of Science degree must be comprised of a minimum of 5 HE credits in programming and 15 HE credits in mathematics. In addition, verified knowledge of English corresponding to the course English B/English 6 in the Swedish Upper Secondary School or equivalent.

The forms of assessment of student performance

Individual written exam. Individual written assignment.

Course contents

Semiconductor components such as diode, thyristor and transistor.
Selfcommutated converters: topology and control of the firing angle.
DC-converters: topology, control and choice of switching frequency and inductance,

capacitance.
One-phase and three-phase voltage source converters: topology, pulse width modulation and vector control.
Calculation of losses for a converter, evaluation of different transistors.
Implementation of power electronic in an electrified vehicle.
Simulation of the converters, including demonstration of the principle of operation and choice of parameters.

Other regulations
Course grading: U/3/4/5
Course language: The teaching is conducted in English.

General rules pertaining to examination at University West are available at www.hv.se.

If the student has a decision/recommendation on special support due to disability, the examiner has the right to examine the student in a customized examination form.

Cycle
Second cycle

Progressive specialization
A1N - second cycle, has only first-cycle course/s as entry requirements

Main field of study
Electrical Engineering