Applied Power Electronics

Tillämpad effektelektronik
6 credits

Programme course

TNE106

Valid from: 2025 Spring semester

Determined by	**Main field of study**	
Board of Studies for Electrical Engineering, Physics and Mathematics	Electrical Engineering	
Date determined	**Course level**	**Progressive specialisation**
2024-08-28	First cycle	G2F
Revised by	**Disciplinary domain**	
	Technology	
Revision date	**Subject group**	
	Electrical Engineering	
Offered first time	**Offered for the last time**	
Spring semester 2023		
Department	**Replaced by**	
Institutionen för teknik och naturvetenskap		

Specific information

The course can not be included in a degree together with TNE102.

Course offered for

- Master of Science in Electronics Design Engineering

Prerequisites

Circuit theory, Circuit theory, advanced course, Analog electronics

Intended learning outcomes

After completing the course the students should be able to:

- describe and do calculations on converters including associated power electronic components and cooling thereof
- describe and do calculations on common electric machines and on simple non symmetric three phase systems with symmetric components
- be familiar with measurement methods in systems with common electric machines and power converters.
- do simulations of power electronic systems with dedicated software.

Course content

The three phase system – Symmetric components

Electric machines – The DC machine, asynchronous and synchronous machines, single phase and three phase transformers.

Converters – Different types of power semiconductors for power converters. Classification of converters. Power converters for single and three phase. Converters with inductive load. Power calculations. EMC and impact on the grid. DC-choppers and DC-DC converters. Different types of inverters for DC-AC conversion.

Thermal calculations – Thermal resistance and thermal impedance.

Simulation of systems with power electronic semiconductor components.

Teaching and working methods

Lectures, exercises and laboratory work.

Examination

TEN1	Written Examination	4 credits	U, 3, 4, 5
LAB1	Laboratory Work	2 credits	U, G

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses: CDIO-course

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.

Other

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

The course is campus-based at the location specified for the course, unless otherwise stated under “Teaching and working methods”. Please note, in a campus-based course occasional remote sessions could be included.