Electrical Drives

Programme course

6 credits

Elektriska drivsystem

TSFS04

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Electrical Engineering

Course level
First cycle

Advancement level
G2X

Course offered for
- Computer Science and Engineering, M Sc in Engineering
- Mechanical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Basic knowledge of circuit theory, electromagnetism, and Matlab.

Intended learning outcomes
To provide basic knowledge of electric machinery. After the course the student should be able to:

- explain the design and operation principles of different types of electric machinery.
- explain and perform calculations on electromechanical energy conversion principles.
- explain the performance characteristics of different types of machines.
- model and parameterize electric machinery.
- describe how different parameters in the engine models affect engine performance.
- design experiments to identify the motor parameters.
- calculate power flows of electric drive systems.
- design and implement control strategies for steady-state operation of electric machinery.

Course content

- Introduction of electric machinery, which includes a brief review of various types of electric machines.
- Review of the main components of electric machines and physical principles used to model these. Special emphasis is placed on understanding of electromechanical conversion principles and magnetic circuits.
- Modeling, parameterization, and control of DC, synchronous, and asynchronous machines.

Teaching and working methods

The course consists of lectures, problem solving sessions, and laboratory sessions.

Examination

LAB1	Laboratory work	2 credits	U, G
TEN1	Written examination	4 credits	U, 3, 4, 5

Grades

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

Department

Institutionen för systemteknik

Director of Studies or equivalent

Johan Löfberg

Examiner

Mattias Krysander

Course website and other links

http://www.fs.isy.liu.se/Edu/Courses/TSFS04

Education components

Preliminary scheduled hours: 60 h
Recommended self-study hours: 100 h

Course literature

Electric Machinery 6th Edition, A. E. Fitzgerald, Charles Kingsley Jr., Stephen D. Umans. Mc GrawHill, Boston, 2003 samt kursens lektionskompendium, laborationskompendium och formelsamling.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.