

SYLLABUS

Electric Drive Systems 7.5 credits E0015E

Elektriska drivsystem

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2022-06-17**

Electric Drive Systems 7.5 credits E0015E

Elektriska drivsystem

First cycle, E0015E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Elektroteknik	Electrical Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and Mathematics including derivatives, integrals, vectors, differential equations and transform theory, such as the courses M0050M Basic Mathematics and Derivatives, M0051M Integrals, Vectors and Matrices and M0052M Differential Equations and Transform Theory or equivalent. Electrical technology corresponding to E0013E Fundamentals of Electrical Engineering or E0003E Circuit theory. Basic knowledge in mechanical systems such as in the course F0060T Mechanics and Experimental Methods or equivalent. Documented skills in English language equivalent to English 6

Selection

The selection is based on 1-165 credits.

Course Aim

After passing the course, the student should be able to

Describe the basic principles of electromechanical energy conversion

Explain operating principles for DC machines, synchronous machines and induction machines

Use analytical models to describe the operation of DC, synchronous and induction machines

Describe the most important parts of a DC-powered system and a three-phase AC drive system.

Describe principles for control and regulation of direct current, synchronous and induction machines

Describe principles for battery management, ie battery types as well as charging, discharging and balancing batteries.

Use a built-in system for controlling small electrical machines.

Be able to account for the problems surrounding electromagnetic emissions and immunity for electric drive systems.

Contents

Electromagnetism and electromechanical models with application to rotating electric machines

Principles for electromechanical energy conversion.

DC machines and their drive systems.

Introduction to three-phase AC drives

Operating principles for synchronous machines.

Operating principles for asynchronous machines.

Control and regulation of AC machines

Battery types and battery management

Electronic systems for controlling electrical machines

Electromagnetic environment for electric drive systems

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures, exercises and laboratory work

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Passed laboratory work and exam

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course E0015E is equal to E7033E

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Laboratory work	G U 3 4 5	2.5	Mandatory	S22	
0002	Written exam	G U 3 4 5	5	Mandatory	S22	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Jonny Johansson, HUL SRT 2022-06-17

Syllabus established

by Jonny Johansson, HUL SRT 2021-06-16