

COURSE DETAIL

DRIVETRAINS FOR ELECTRIC VEHICLES AND WIND TURBINES

Country

Sweden

Host Institution

Lund University

Program(s)

Lund University

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Mechanical Engineering Engineering Electrical Engineering

UCEAP Course Number

163

UCEAP Course Suffix**UCEAP Official Title**

DRIVETRAINS FOR ELECTRIC VEHICLES AND WIND TURBINES

UCEAP Transcript Title

DRIVETRNS ELEC VEHI

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

This course provides the knowledge needed to participate in development and control of drivetrain in modern electric vehicles and in wind power generation. Lectures and arithmetic exercises include the following: Modulation and Current Control methods for power electronic circuits. This is a repetition of required prior knowledge built in the preceding course EIENnn "Power Electronic Control and Design Project". EV drivetrains design based on vehicle performance requirements. Battery voltage level, Power electronic switching frequency, Maximum vehicle speed, Acceleration requirements, hill climbing requirements, Size requirements, Number of gears. Wind turbine design based on performance requirements. Turbine Size and rotor speed range, mechanical and electrical transmission, power optimization dependent on wind speed, ancillary services requirements. Modelling of electrical machines. Torque map, flux map, voltage limitation, current limitations, optimal operating points. Applications on both EV drives and Wind power generation. Control of electrical machines. Optimal operating points, Torque control, Magnetic flux limitations, Field weakening control, Applications on both EV drives and Wind turbines. Simulation tasks and laboratory work include electric machine (PMSM) in a vehicle drive system and electrical machine (PMSM) in a wind power system. These labs are prepared through simulation work, which is reported as a homework before the lab. After the laboratory, a report is written where simulations and measurements are compared. Assumed prior knowledge: EIENnn Power Electronic Control and Design Project, ESSF01 Analogue Circuits, ESS030/ESSF20 Physics of Devices, ESSF15 Electrical Engineering (EE, WE), MIE012/EIEF35 Electrical Engineering, basic course (ME) or EITF90 Electromagnetics and Electronics (FE) and FRT010/FRTF05 Automatic Control, Basic Course.

Language(s) of Instruction

English

Host Institution Course Number

EIEN80

Host Institution Course Title

DRIVETRAINS FOR ELECTRIC VEHICLES AND WIND TURBINES

Host Institution Course Details

https://kurser.lth.se/lot/course-syllabus/25_26/EIEN80

Host Institution Campus

Lund

Host Institution Faculty

Engineering

Host Institution Degree**Host Institution Department****Course Last Reviewed**

2025-2026

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