

COURSE DETAIL

POWER ELECTRONIC CONTROL AND DESIGN PROJECT

Country

Sweden

Host Institution

Lund University

Program(s)

Lund University

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Engineering Electrical Engineering

UCEAP Course Number

171

UCEAP Course Suffix**UCEAP Official Title**

POWER ELECTRONIC CONTROL AND DESIGN PROJECT

UCEAP Transcript Title

POWER EL CONTROL PR

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

This course provides knowledge about the most important power electronic circuit configurations, including both power semiconductors and passive components like inductors and capacitors in addition to how modulation and current control is done in the most relevant circuits. The course includes a project to design a power electronic circuit with a specific set of functional specifications. Participants develop and verify (electrically and thermally) a power electronic converter for a low power application like an electric scooter or bicycle motor drive. The battery supply and the motor are given, but the power electronic converter with its modulation and control are developed as a part of the course. Topics include diodes, transistors (BJT, IGBT, MOSFET), materials (silicon, silicon carbide), inductors, capacitors, sensors (current, voltage). Function, mechanical and thermal design, aging, drive and protection circuits, various bridges such as 1Q, 2Q and 3-phase 2- and multi-level converters, parasitic components, load currents, and earth currents, carrier modulation, sampled current control, tolerance band control of current, voltage control, switching power supplies, motor drive systems for DC and AC motors, solar cell converters, electric vehicle chargers, "Unified Power Flow Controllers" (UPFC), active power filters, and high voltage direct current (HVDC). Assumed prior knowledge: ESSF01 Analogue Circuits, ESS030, ESSF20 Physics of Devices, ESSF15 Electrical Engineering (EE) or MIE012, EIEF35 Electrical Engineering, basic course (ME) and FRT010, FRTF05 Automatic Control, Basic Course.

Language(s) of Instruction

English

Host Institution Course Number

EIEN75

Host Institution Course Title

POWER ELECTRONIC CONTROL AND DESIGN PROJECT

Host Institution Course Details

https://kurser.lth.se/lot/course-syllabus/25_26/EIEN75

Host Institution Campus

Lund

Host Institution Faculty

Engineering

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

2025-2026

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