EJ2410 Hybrid Vehicle Drives 7.5 credits

Hybrida fordonsdrivsystem

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for EJ2410 valid from Autumn 2010

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Completed Bachelor's degree (180 higher education credits), or equivalent academic qualifications. Documented proficiency in English corresponding to English B.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

Aim of the course is to give a broad insight into alternative solutions for conversion of primary energy to transport activity for road vehicles. Different types of fuel (fossile, bio, ...), different types of conversion methods (FC, ICE, HEV), different topologies and auxiliary power systems are considered.

After completed course the student should be able to

- explain how a hybrid vehicle works and describe its main components and their function.
- describe the different hybrid topologies with respect to their functional blocks and their characteristics.
- design and implement both simple and advanced models of the vehicles.
- analyze the performance of a hybrid vehicle.
- build efficiency models of important components.
- evaluate the environmental impact of road vehicles.
- calculate basic electrical and thermal properties for power electronic converters.
- describe the operating principle and properties for the most common types of electrical motors in hybrid technology.
- describe the operating principle for fuel cells and energy storage elements and calculate basic performance of them.
- describe the fuel alternatives for hybrid vehicles.
- solve, in a group, a given assignment and both in written form and orally present and discuss the result.
- discuss about future trends.

Course contents

Vehicles of today – propulsion and auxiliary systems.

Driving factors for environment friendly vehicles.

Propulsion and auxiliary systems for hybrid vehicles.

Generic components.

System concepts and simulations.

Development trends.

Course literature

Textbook, Hybrid Vehicle Drives, 2006. Course binder with project descriptions and laboratory hand-out.

Examination

- PRO1 - Project, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

One written examination. (TEN1; 4,5 credits)
Two assignments and one laboratory exercise. (PRO1; 3 credits).

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.