Course
EFA - Electric vehicle drivetrain

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⌃ General information

Long name	Electric vehicle drivetrain
Approving CModule	EFA_MaET
Responsible	Prof. Dr. Andreas Lohner Professor Fakultät IME
Level	Master
Semester in the year	summer semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr. Andreas Lohner Professor Fakultät IME
Requirements	Fundamentals of electrical engineering power electronics Basics of electric drives Analogue signals and systems
Language	German
Separate final exam	Yes

Final exam

Details

By means of an oral exam, the learned contents and competencies are queried

Minimum standard

Purely content knowledge defines the limit of pass

Exam Type

By means of an oral exam, the learned contents and competencies are queried

^ Lecture / Exercises

Learning goals

Knowledge

Basic concepts and historical drive development

Mechanical fundamentals, rotating field theory, modeling

Field-oriented control of the induction / synchronous machine

Structure, function and control of the switched reluctance machine

Further vehicle-specific controls

Electric train and bus drives with project examples

Hybrid and electric drive topologies with project examples

Storage technologies for vehicles

Skills

Students will be able to capture the functionalities of a modern vehicle propulsion system (hybrid and electric vehicle).

They know and understand the essential control concepts of the different topologies and are able to carry out simple closed-loop control simulations and to use this knowledge to convert the results to the drive.

Students are able to design and dimension drive systems.

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	0
Exercises (shared course)	1
Tutorial (voluntary)	0

Separate exam

^ <u>Practical training</u>

Learning goals

Knowledge

Recognize drive characteristics and properties and record them by measurement (analyze drive system)

Skills

Structure the system
Define subsystems
Define subsystem functions
Create drivetrain model
Design drive control
Design energy management algorithms
Understand commercial development tools and use them purposefully
Put control on the target system into operation

Coping with complex tasks in a team
Plan and control simple projects
Comply with agreements and deadlines
Plan and conduct reviews

The students learn methods for the dynamic description and regulation of hybrid and electric vehicle drives and thereby obtain decision-making authority.
The students have experience in dealing with power electronics, drives, classic measuring devices and are able to model drivetrains with a simulation tool.
Students have the ability to understand, dimension and control electric and hybrid drivetrains.

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0

Separate exam