

Module Handbook (<https://modhb.uni-kl.de/>)

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Module EIT-JEM-517-M-7

Electric and Hybrid Vehicles (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
EIT-JEM-517-M-7	<i>Electric and Hybrid Vehicles</i>	3.0 CP (90 h)
MV-JEM-517-M-7	<i>Electric and Hybrid Vehicles</i>	4.0 CP (120 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in SuSe
Level	[7] Master (Advanced)
Language	[EN] English
Module Manager	Görges, Daniel, apl. Prof. Dr.-Ing. (EXT DEPT: EIT) (/staff/618/)
Lecturers	Görges, Daniel, apl. Prof. Dr.-Ing. (EXT DEPT: EIT) (/staff/618/)
Area of study	[EIT-JEM] Electro Mobility
Reference course of study	[EIT-88.-SG#2021] M.Sc. Automation and Control (A&C) [2021] (/mhb/FB-EIT/cos-676/)
Lifecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	EIT-JEM-517-K-7 (/mhb/courses/EIT-JEM-517-K-7/)	P	-	PL1	3.0	SuSe

- About [EIT-JEM-517-K-7]: Title: "Electric and Hybrid Vehicles"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **written exam (Klausur) (90 Min.)**

- Examination Frequency: each semester

Evaluation of grades

The grade of the module examination is also the module grade.

Contents

From [EIT-JEM-517-K-7] **Electric and Hybrid Vehicles** (/mhb/courses/EIT-JEM-517-K-7/):

- Fundamentals of electric and hybrid vehicles (definitions, architectures, driving cycles, modeling, simulation, optimization)
- Longitudinal dynamics (equation of motion, vehicles resistances, vehicle performance, braking systems)
- Transmission systems (classification, manual gearboxes, friction clutches, automatic transmissions, torque converters, continuously variable transmissions, efficiencies)
- Propulsion systems (classification internal combustion engines, electric motors, power electronics)
- Storage systems (classification, batteries, supercapacitors, flywheels)
- Energy management systems (classification, examples)
- Illustration of the contents using simulations with MATLAB/Simulink und real vehicle data

Competencies / intended learning achievements

After completing this module you can...

- ... model, simulate, optimize, dimension and evaluate electric and hybrid vehicles.
- ... explain the energy conversion and energy losses in electric and hybrid vehicles.
- ... explain the operation strategies for electric and hybrid vehicles.
- ... assess and select architectures for electric and hybrid vehicles.
- ... assess and select as well as dimension and optimize the transmission, propulsion, storage and energy management system in electric and hybrid vehicles.

Requirements for attendance (informal)

None

Requirements for attendance (formal)

None

References to Module / Module Number [EIT-JEM-517-M-7]

Course of Study	Section	Choice/Obligation
[EIT-82.781-SG#2019] B.Sc. Electrical and Computer Engineering [2019] (/mhb/FB-EIT/cos-523/)	Elective Subjects	[W] Elective Module
[EIT-88.781-SG#2010] M.Sc. Electrical and Computer Engineering [2010] (/mhb/FB-EIT/cos-556/)	Elective Subjects	[W] Elective Module
[EIT-82.?-SG#2021] B.Sc. Electrical and Computer Engineering [2021] (/mhb/FB-EIT/cos-685/)	Technical Elective Modules	[W] Elective Module
[EIT-88.?-SG#2021] M.Sc. Electrical and Computer Engineering [2021] (/mhb/FB-EIT/cos-686/)	Technical Elective Modules	[W] Elective Module
[EIT-88.A20-SG#2021] M.Sc. European Master in Embedded Computing Systems (EMECS) [2021] (/mhb/FB-EIT/cos-566/)	Elective Subjects	[W] Elective Module
[EIT-88.?-SG#2021] M.Sc. Automation and Control (A&C) [2021] (/mhb/FB-EIT/cos-676/)	Major "Real-Time Control Systems" (RCS)	[P] Compulsory
[EIT-88.?-SG#2021] M.Sc. Automation and Control (A&C) [2021] (/mhb/FB-EIT/cos-676/)	Elective Modules	[W] Elective Module
[EIT-88.?-SG#2021] M.Sc. Embedded Computing Systems (ESY) [2021] (/mhb/FB-EIT/cos-677/)	Elective Subjects	[W] Elective Module
Module-Pool	Name	
[GS-CVT-EE-E-MPOOL-6 (/mhb/modulepools/GS-CVT-EE-E-MPOOL-6/)]	Catalog Electives Electrical and Computer Engineering	

References to Module / Module Number [MV-JEM-517-M-7]

Course of Study	Section	Choice/Obligation
[MV-88.235-SG] M.Sc. Vehicle Engineering (/mhb/FB-MV/cos-547/)	Pflichtmodule	[P] Compulsory