

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

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Module EIT-LRS-509-M-7

Control in Power Electronics (M, 3.0 LP, ANL)

Module Identification

Module Number	Module Name	CP (Effort)
EIT-LRS-509-M-7	<i>Control in Power Electronics</i>	3.0 CP (90 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in WiSe
Level	[7] Master (Advanced)
Language	[EN] English
Module Manager	Liu, Steven, Prof. Dr.-Ing. (PROF DEPT: EIT) (/staff/345/)
Lecturers	Liu, Steven, Prof. Dr.-Ing. (PROF DEPT: EIT) (/staff/345/)
Area of study	[EIT-LRS] Control Systems
Reference course of study	[EIT-88.-SG#2021] M.Sc. Automation and Control (A&C) [2021] (/mhb/FB-EIT/cos-676/)
Lifecycle-State	[ANL] Start-Up Period

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	EIT-LRS-509-K-7 (/mhb/courses/EIT-LRS-509-K-7/)	P	-	no	3.0	WiSe

- About [EIT-LRS-509-K-7]: Title: "Control in Power Electronics"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **examination in form of partial achievements**
- Examination Frequency: each semester

Evaluation of grades

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

Contents

From [EIT-LRS-509-K-7] **Control in Power Electronics** (/mhb/courses/EIT-LRS-509-K-7/):

- Dynamic modeling of dc/dc converters, nonlinear and linearized behavior
- Linear and nonlinear control synthesis for dc/dc converters
- Dynamic modeling of dc/ac converters and LLC resonant converters
- Control design for dc/ac and resonant converters
- FACTS and active power filter control
- Modeling and control design for modular multi-level converters (MMC)
- Typical applications of controlled power electronic systems (e.g. grid integration, power quality enhancement, electric vehicles, renewable energy sources, stationary and mobile energy transmission, energy storage management etc.)

Competencies / intended learning achievements

After completing this module you can...

- ... explain and apply different modeling methods for power electronic systems.
- ... explain and apply design concepts for DC/DC and DC/AC converters.
- ... explain control strategies for FACTS and active power filters.
- ... explain modeling and control strategies for MMC.

Requirements for attendance (informal)

Modules:

- [EIT-LEL-230-M-4] Fundamentals of Power Electronics (M, 4.0 LP) (/mhb/modules/EIT-LEL-230-M-4/)
- [EIT-LRS-504-M-3] Linear Control (M, 5.0 LP) (/mhb/modules/EIT-LRS-504-M-3/)

Requirements for attendance (formal)

None

References to Module / Module Number [EIT-LRS-509-M-7]

Course of Study	Section	Choice/Obligation
[EIT-88.781-SG#2010] M.Sc. Electrical and Computer Engineering [2010] (/mhb/FB-EIT/cos-556/)	Elective Subjects	[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