

Courses in English

Course Description

Department	06 Applied Sciences and Mechatronics
Course title	Power Electronics
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	<p>With reference to the higher-level objectives of the Bachelor's program in Engineering Physics, this module contributes primarily to competence area 3: Application of physical insights to new technologies.</p> <p>The module imparts deeper engineering knowledge of power electronics devices. Participants in the course learn to design and to analyse electronic circuits and systems. They learn to use industry-standard software like Spice for circuit simulations and Matlab for analysing and visualising measurement data.</p> <p>After successful completion of the module, participants can assess engineering problems in the field of power electronics and develop own solutions.</p>
Prerequisites	Fundamentals of electrical engineering, electronic devices and electronic circuits. Practical skills in working with multimeters and oscilloscopes.
Recommended reading	Ned Mohan, Power Electronics, Wiley, 2012. Raymond Ramshaw, Power Electronics Semiconductor Switches, Chapman & Hall, 1993.
Teaching methods	Teaching in small classes (lecture), excercises, lab
Assessment methods	Exam, simulation/lab evaluation
Language of instruction	English
Name of lecturer	Prof. Dr.-Ing. Torsten Mahnke
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Link	http://www.fb06.fh-muenchen.de/fb/index.php/de/vita.html?staffid=785 http://www.fb06.fh-muenchen.de/fb/index.php/de/bachelorstudium/phb/studieninhalte.html?ItemID=&id=82&ids=1874
Course content	<p>Introduction to power electronics Multimeters and oscilloscopes for converter characterization Current sensing using shunts and current transformers Semiconductor power switches Passive components DC-DC converters I (buck) Converter losses and efficiency DC-DC converters II (boost) Thermal design DC motor drives Three-phase power systems AC-DC conversion (rectification) and SMPS Network disturbances/EMI BLDC motor drives Three-phase motor drives DC-AC conversion (inversion, "Frequenzumrichter") More applications (LED lighting, UPS, ...)</p>
Remarks	