# Courses in English

## Course Description

<table>
<thead>
<tr>
<th>Department</th>
<th>06 Applied Sciences and Mechatronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course title</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>Hours per week (SWS)</td>
<td>4</td>
</tr>
<tr>
<td>Number of ECTS credits</td>
<td>5</td>
</tr>
</tbody>
</table>

### Course objective

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. 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. After successful completion of the module, participants can assess engineering problems in the field of power electronics and develop own solutions.

### Prerequisites


### Recommended reading


### Teaching methods

Teaching in small classes (lecture), excercises, lab

### Assessment methods

Exam

### Language of instruction

English

### Name of lecturer

Prof. Dr.-Ing. Torsten Mahnke

### Email

torsten.mahnke@hm.edu

### 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&id=1874

### Course content

- 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, ...)

### Remarks