

Overview and education:

The University of Applied Sciences Augsburg is located in the South of Germany and has a history of more than 300 years. In the last century intermittent it was called "Rudolf Diesel Polytechnikum" with respect to Augsburg's most popular engineer Rudolf Diesel, the inventor of the world wide well known diesel engine. Today, the University of Applied Sciences Augsburg has approx. 4500 students and is well established. The educational arm consists of seven faculties. One of them is the department of Electrical Engineering with approx. 600 students and 18 professors. It contains the power electronics institute with actual 35 students per year, too.



In the power electronics course of the Bachelor- degree following items will be discussed:

- Passive components, the influence of the EMI behaviour and filter topologies
- Today's most important semiconductors
- DC/DC converter
- DC/AC and AC/DC converter
- Principles of SMPS

In cooperation with the University of Ulster (Belfast), a Master course will be offered. In the "power electronics and drives"- lecture the students learn details of space vectors and different types of three phase inverters. Mini projects complete the course.

The new degree "Master of Applied Research", university experiences come together with the industry. For details, please contact us.

In the lab:

The power electronics laboratory is well equipped for education as well as research and development investigations. The focus is on the small and medium power range. The AC-power supply is designed for voltages up to 1000V and the maximum (line)-power is up to 40kW. In the lab a 500V/ 10kW- DC- network is available, too. A wide spectrum of measuring systems allows analysing the EMI-behaviour as well as a high precision power determination. Combining these with our infrared camera for thermal investigations complex system tests can be done. But it has to point out, that outsourcing or a very rapid prototyping can not be offered.

Research and development:

The focus of the institute is on high efficient PFC- stages. In Today's topologies, a bridge rectifier rectify the mains voltage. The output of the bridge rectifier is connected to a boost converter. Input



rectifier and the PFC diode build up two rectification stages. This reduces the efficiency more than necessary. Bridgeless PFC's have less conduction losses. Due to the missing rectifier bridge bridgeless PFC-converter causes a higher common mode noise than with Today's standard boost converters. A simple and low cost new L-C-EMI- filter was found out and published. After that, a digitally control circuit was designed. Also the input voltage respectively input current measuring was optimized.

Some other investigations with industrial partners are:

- Thermal and electrical failure analysis of solar inverters
- Analysing of the influence of modern diodes (SiC, GaAs) on the total PFC-stage efficiency.
- Influence of IGBT or MOSFET on the efficiency in electronic ballast
- Energy recovery inverter for agricultural application
- Analysing of thyristor- controlled arc welding systems