



# Power Electronics

The increasing need for more efficient energy usage has boosted the importance of power electronics in recent years. Along with great potential for energy savings comes a set of challenges.

This course gives a unique insight into several new and important aspects of power electronics. One day will cover the use of wide-bandgap semiconductors in power electronic application, while the other day will concern Electromagnetic Compatibility (EMC).

The aim is to give an overview and a hands-on understanding on these two issues that are projected to become more prominent in future product development. The course was developed by researchers of the Mads Clausen Institute in collaboration with external partners such as the Fraunhofer Institute ISIT in Germany and DELTA in Denmark.

## Benefits

On the course you will receive:

- A broad overview on Physics of Semiconductors used in Electronic and Power Electronic Devices
- Knowledge on Wide Bandgap Semiconductors used in Power Electronics
- Knowledge on EMI and EMC issues
- Access to a pool of broad scientific and engineering expertise
- Opportunity to exchange experiences and network with colleagues

## Audience

The course content is addressed to skilled professionals working in different industrial sectors such as power electronics, advanced electronics and/or mechatronics, microtechnologies or similar.

Basic knowledge of engineering and/or physics corresponding to a bachelor, civil engineer, professions bachelor or similar is expected.

## Time and place

22.-23. January 2015

The course is held at University of Southern Denmark, Sønderborg campus

## Price

6.000 kr. excl. VAT

The price includes tuition, materials and meals during the course days. The price does not include accommodation.

## Registration

Deadline 12. December 2014

On our website: [www.sdu.dk/sdue](http://www.sdu.dk/sdue)

# Program

## Day 1 Morning: Introduction to Physics of Semiconductors and Power Devices

- Energy bands and forbidden gaps
- Charge carriers, generation and recombination, density of states, doping
- Transport properties, semiconductors under non-equilibrium, junctions
- Devices and power devices

## Day 1 Afternoon: Wide-bandgap devices compared to silicon devices

- Wide-bandgap devices, transistor and diode structures up to 1200V, differences to silicon devices
- Improvements in static and dynamic device performance
- Advantages in dedicated converter applications
- Reliability topics

## Day 2 Morning: EMI and EMC

- Introduction to EMC
- Standards for regulatory compliance in EU
- Radiated and conducted emission
- Radiated and conducted immunity
- Burst, surge, flicker, harmonics and ESD

## Day 2 Afternoon: Hands-on EMC

- EMC HALT
- Design reviews – what to look for in pcb design
- A low cost Pre-compliance toolbox
- Troubleshooting with near-field probes

**Prof. Dr. Ing. Holger Kapels** is Professor at the Hamburg University of Applied Sciences where he is leading research projects concerning power electronic systems for use in the renewable energy sector.

**Anders P. Mynster** is an EMC and EMC & wireless specialist at DELTA. Where he has guided electronic developers through EMC problems and wireless designs

**Prof. Stefan Mátéfi-Tempfli** is Professor at the Mads Clausen Institute of the University of Southern Denmark where he is leading the Mechatronics group

### Contact

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