

Organisational Information

Sign up at: www.ecpe.org/events

Registration Deadline:

- **24 September 2020**

Participation Fee:

- **€ 320,-** * for industry
- **€ 290,-** * for universities/institutes
- **€ 120,-** * for students/PhD students (limited spaces; copy of students ID required; dinner € 50,-* extra)

* plus VAT

- The participation fee includes lectures and digital proceedings (provided 1 day prior to the event by email).
- Participation by web conference tool (Webex). Access data will be provided by email.
- Upon receipt of registration confirmation via email you are signed-up for the event. The invoice will be sent via letter post.
- ECPE members are able to register 1 participant free of charge, 25 % discount for further participants.
- 10 % discount for participants from ECPE competence centres.
- Cancellation policy: Full amount will be refunded in case of cancellation up to 1 week prior to the event. After this date and in case of no-show 50 % of the fee is non-refundable (substitutes are accepted anytime).

Organisational Information

Organiser ECPE e.V.
90443 Nuremberg, Germany

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Course Instructors



Hans-Peter Feustel, ECPE (DE)



Prof. Wulf-Toke Franke,
University of Southern Denmark (DK)



European Center for
Power Electronics e.V.

Digital Event

ECPE Online Tutorial

Introduction to Power Electronics

29 - 30 September 2020



Introduction to Power Electronics

29 – 30 September 2020

With the advance of automation and increasing demands on energy efficiency, many industrial applications use closed-loop controlled drives based on power electronics. Power electronics also play a key role in feeding renewable energies from photovoltaic and wind power into the grid as well as coupling different voltage systems, e.g. battery energy storage systems. This also applies to electromobility, both on the vehicle side with the drive converter and various power-electronic converters in the car, as well as on the grid side with the charging infrastructure, e.g. for DC fast charging.

The aim of the training is to convey the basic structure and above all the behaviour of power electronic components and circuits. The important circuit topologies are discussed and their use in various applications is shown.

The training is aimed at scientists, engineers and technicians who have no background in electrical engineering and especially in power electronics, and who want to acquire general knowledge of the basic behaviour and characteristics of power electronics. On the other hand, the training is also intended for users of power electronics who work more on a system level. Here the knowledge of the basics of power electronics helps to make the right decisions and measures.

Course Instructors:

Hans-Peter Feustel, ECPE e.V. (DE)
Prof. Wulf-Toke Franke,
University of Southern Denmark (DK)

All presentations and discussions will be in English.

Programme Overview

1. **Electronic Basics**
2. **General Basics of Power Electronics**
 - a. Components of Power Electronics
 - i. Passives
 - ii. Semiconductors
 - b. Principle of converters
 - c. Switching Process
 - d. Gate Drive
3. **Circuit Topologies**
 - a. DCDC Converter
 - i. Not galvanically isolated
 - ii. Galvanically isolated
 - b. ACDC Rectifier
 - i. Diode rectifier
 - ii. Active rectifier, PFC
 - iii. Thyristor circuits
 - c. DCAC Inverter
 - i. Basics and control principles
 - ii. Currents in transistors, diodes and DC link capacitors
4. **EMC Considerations**
 - a. Introduction
 - b. EMC in power electronics
 - c. Design principals
5. **Assembly Concepts**
 - a. Electrical design considerations
 - b. Thermal assembly concepts
6. **Applications**
 - a. Automotive
 - b. Industry
 - c. Solar
 - d. Wind power
7. **Summary and Discussion**

Programme

Tuesday, 29 September 2020

09:00 Welcome, Opening
Bernd Bitterlich, ECPE e.V.

09:10 Electronic Basics

10:30 Break

10:45 Components of Power Electronics

12:30 Lunch

13:15 Principle of Converters

14:45 Break

15:00 Switching Process and Gate Drive of Power Semiconductors

16:15 End of 1st Day

Several short breaks in between upon request

Wednesday, 30 September 2020

08:30 Start of 2nd Day

08:30 Circuit Topologies Part 1

10:30 Break

10:50 Circuit Topologies Part 2

12:30 EMC Considerations

13:00 Lunch

13:45 Assembly Concepts

14:45 Break

15:00 Applications

16:30 Summary and Discussion

Several short breaks in between upon request

16:45 End of Tutorial