

Registration (Fax Reply)

To: ECPE e.V.
Att.: Ingrid Bollens

Fax: +49 (0)911 / 81 02 88 – 28

Registration before **16 July 2009**

Participation fee:

.. €480,- for industry

.. €380,- for universities

The fee includes the tutorial, dinner, lunch,
coffee/soft drinks and handouts.

With the confirmation of seminar registration you will receive
the invoice. A discount of 50 % is given to ECPE Member
Companies.

In case of cancellation after 16 July 2009 or non-attendance
50 % of the participation fee are payable

The number of participants is limited to 35 attendees.

Sender:

title, given name, name

company, department

full address

phone, fax

e-mail

date, signature

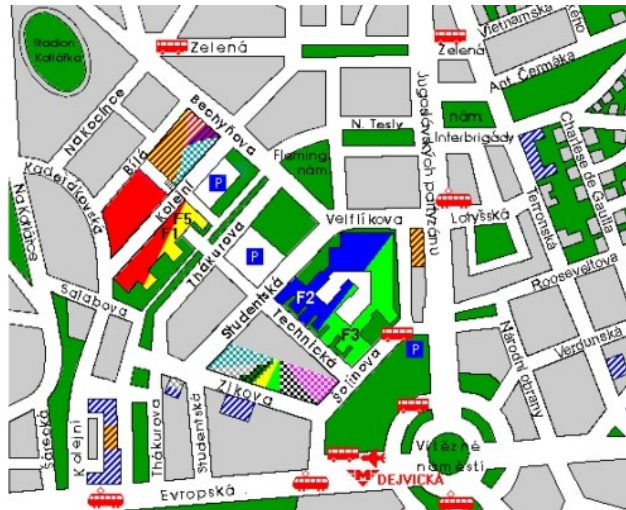
Organisational information

Organiser: ECPE e.V.
90443 Nuremberg, Germany
www.ecpe.org

Course instructor: Prof. Dr. Eckhard Wolfgang

Organisation: Ingrid Bollens, ECPE e.V.
+49 (0)911 / 81 02 88 – 10
ingrid.bollens@ecpe.org

Place of seminar: Czech Technical University
Technická 2,
166 27 Praha 6,
Czech Republic



Further information (hotel list and maps) will be
provided after registration.



**ECPE European Center for
Power Electronics e.V.**

ECPE Tutorial

Reliability of Power Electronic Systems

**22 – 23 July 2009
at Czech Technical University
Prague**

Introduction

ECPE Tutorial “Reliability of Power Electronic Systems”

22 & 23 July 2009
Prague, Czech Republic

The aim of the tutorial is to teach the basics of modern reliability engineering. This is based on physics-of-failure-concept and the intended mission profile of the electronic system and its components. The mission profile considers the combination of stresses versus time to which the electronic system is subjected during its application time. Especially application oriented end-of-life testing is under strong consideration today. This requires the design of appropriate accelerating stress tests. To secure reliability of power electronics systems the building-in reliability philosophy will be explained by examples.

Beside the very successful seminar series, ECPE is starting a tutorial programme focussing more on education of young engineers and engineers from neighbouring disciplines.

The course instructor of the reliability tutorial is
Prof. Dr. Eckhard Wolfgang

Co-instructors are
Dr. Wolfgang Gerling, Consultant
Dr. Edith Clavel, LEG - G2ELab

All presentations and discussions will be in English.

Programme

Wednesday, 22 July 2009

9:30 am *Start of registration*

10:30 **Welcome, Opening**

10:45 **Introduction**

- scope of tutorial
 - content
- E. Wolfgang

11:15 **Definitions and Characteristics**

- quality, reliability
 - degrading / failure mechanisms, models
 - reliability phases
- W. Gerling

12:15 **Mission Profiles**

E. Wolfgang

1:00 pm *Lunch*

2:00 **Virtual Performance Assessment:**

i) Power Electronics Circuit Design

- a – from the electromagnetic modelling to the performances of the structures
- modelling of connections
- current density and losses evaluations
- near radiated field, common mode current

b – towards some cabling rules

E. Clavel

3:00 *Coffee break*

3:30 **ii) Power Electronics Thermal Design**

- simulation
- measurements

E. Wolfgang

4:30 **iii) Advanced Cooling Technologies**

E. Wolfgang

5:15 *Wrap up 1st day*

5:45 *End*

7:30 pm *Dinner*

Programme

Thursday, 23 July 2009

9:00 am *Open questions from 1st day*

9:30 **Virtual Reliability Assessment**

i) Physics-of Failure Concept
W. Gerling

**ii) Examples for Failures in
Power Electronics**

E. Wolfgang

10:30 *Coffee*

11:00 **iii) Reliability Risk Analysis**

E. Wolfgang

iv) Life Time Prognosis: solder cracking

E. Wolfgang

12:30 **Reliability Evaluation Programme**

early, random, end-of-life phase

Robustness Validation

- change of test paradigm
- test samples size
- robustness margins

W. Gerling

1:15 pm *Lunch*

2:15 **Zero Defect Strategy**

- first time right in design
- zero defect in processes

W. Gerling

3:00 *Wrap up tutorial*

3:30 pm *End*