

# EMC Design

## Electronics

### Who should attend:

The *EMC Design* is developed for Electronic Engineers and Technicians that have need of a more thorough EMC-knowledge by examples and calculations. The course is only delivered as the last day in the suite of *EMC Introduction* and *EMC*.

### Prerequisites:

The *EMC* course (*EMC-2*) gives the pre-knowledge of *EMC Design*. Practical experience of electronics will support the understanding but is not required.

### Content

*EMC Design* continues beyond *EMC-2*. *EMC Design* exemplifies applications of model descriptions to be a theoretical and practical approach and let the participant get a more thorough understanding of EMC Design. It's also possible to reflect over and discuss questions in the field that directly relates to the participants work and experiences.

The course has English documentation and is delivered in English or Swedish.

Extract of the content.

#### Power Supply in High Speed systems

- Wires and wavelengths
- Impedance between reference planes
- Waveguide in reference plane
- Aspects on how to make a Vcc -plane
- Methods of Calculation

#### Segregation in modules

- Functional modules
- Bulk Capacitances
- Decoupling

#### Signals to and from modules

- How to connect
- Grounding
- Impedances

#### Field emission from Oscillators and Drivers

- Application of the Transmission Line model
- Calculations and Superpositioning
- Spectra of Emission, 30-1000 MHz
- Reduction of field emission
  - Multilayer PCB's
  - Surface mounted devices
  - ASIC's
  - Cabling
  - System
- Transients

#### Shielding

- Modules
- Equipotential Surface
- Transfer Impedance
- Apertures and slots
- Resonances that relates to stray capacitances

#### From Modules to System

#### Rules of Design

#### Examples of Calculations

Code: EMC-3  
Length: 1 day  
Fee: 620 EUR + VAT  
or according to an offer for "In-house" delivery or a group attending an open event.

The course is developed for Electronic Engineers and Technicians

The *EMC-2* sets level of pre-knowledge.

*EMC Design* gives a more practical approach and opens for questions more related to participants experiences.

**Next event  
9th of October  
in Linköping**

**Special offer!**

**3 for 2  
or  
20% discount  
per seat  
when order  
training before  
31st of Dec 2014**

**Reservation  
Code:EMCE2014**

## Our stance of policy regarding pricing and size of group

The Training is done towards a group of persons - and each one is expected to have benefits of the training in the daily work. It means that each participant invest in competence to be more efficient, increase quality and as a result be more comfortable to fulfil the projects.

This is reflected in our way of pricing and the group size of our training. The price for in-house training is consequently related to the number of participants and the upper limit is 12-16. An efficient training requires engaged participants and a continuing dialogue that can be hard to reach with a high number of participants.

## Training methodology

This course is composed by our appreciated InfoMap methodology which requires a wide whiteboard. A screen not hiding the board give good conditions to expand subjects and illustrate on the screen at the same time as holding the main presentation on the board.

## To keep in mind when to ask for an offer

For an efficient procedure of making an offer we need some information related to the questions below.

If you have access to premises we ask for answers of the following questions.

### Premises for training:

- Has the premises a whiteboard with minimum size of 2.5m x 1.2m (WxH)?
- Is a PC-projector and screen accessible for use?
- Does the screen hide the whiteboard? If not can the PC-projector still be directed to screen?
- Has the premises a flipchart?

### **Pricing and number of participants**

### **InfoMap Conditions for good training**

### **Keep in mind**

### **Premises for training**

It can be good to have the possibility to a more informal way of contact than the training conditions permits. One way to make this happen is during coffee breaks and lunch. We ask if coffee and/or lunch shall be included in the price or if it is handled by participants themselves.

### Coffee and lunch breaks:

- How is it expected to be arranged - individual or in common?
- How is the conditions to have coffee/lunch close by training premises?

### **Coffee & lunch**

We appreciate if we can have information about the level pre-knowledge/experience and the aim of the training for the group and if it is individuals that want to reach further. Naturally we need to know the total number to be trained.

### **Pre-knowledge Aim of training Number of participants**

We try to meet Your need regarding time and place of delivery. We appreciate if You can give a couple of choices regarding time of delivery. If You do not have access to premises suitable for training we appreciate a recommendation of a hotel or conference centre.

### **Time and place of delivery Daily time frame**

We use to start our training 8:30 AM, 1 hour lunch at 12 and end up around 4:30 PM. If You have other wishes regarding scheduling tell us and we try to adapt.

## Adaptation of EMC Design to specific needs

If You have a need for an enhance of some part tell us and we try to adapt Your needs.

### **Adaptation**

Frendus is a training company with focus in electronics, telecommunication and data communication. We offer our training services in our own premises in Sweden or internationally. We do high quality training and are open to adapt to the conditions of the group regarding level and content.

### **EMC and ESD Data Communication Radio & Transmission Mobile Systems Wireless Access**

We also offer coaching to companies who want to support their employees in the role of trainer or to speak to a group.

### **Train the Trainer**

Welcome to take contact for more information!