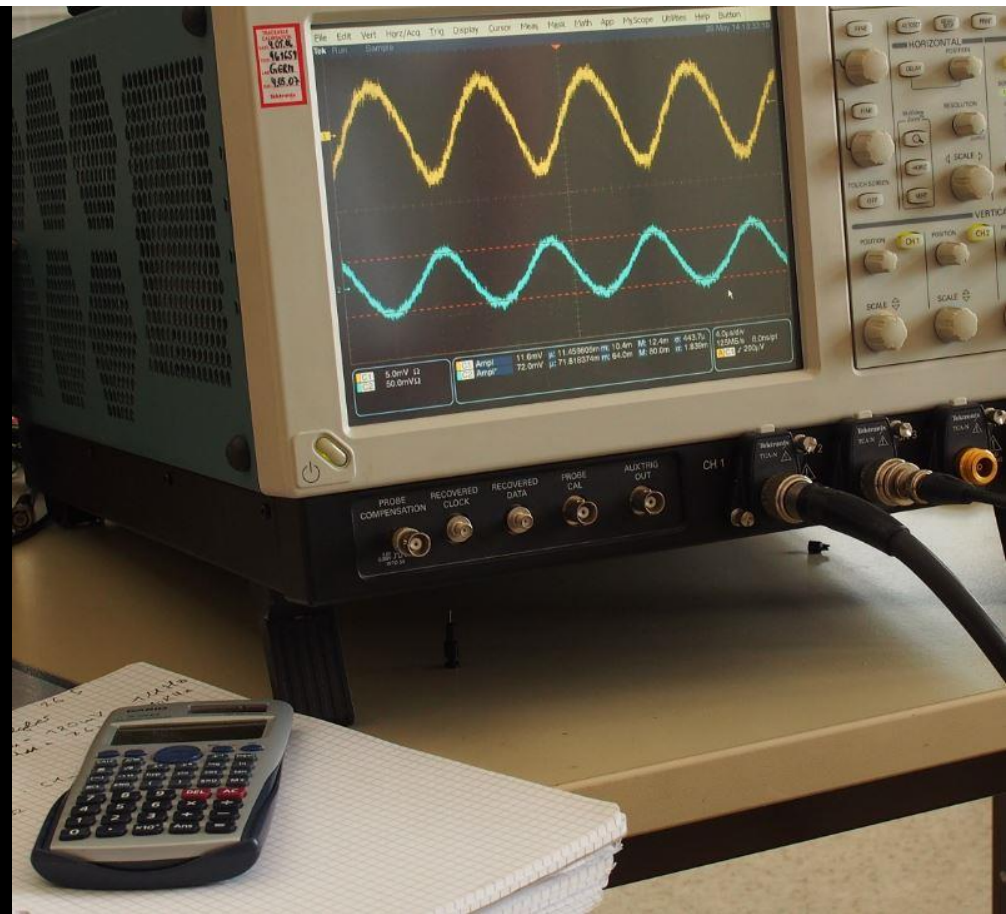
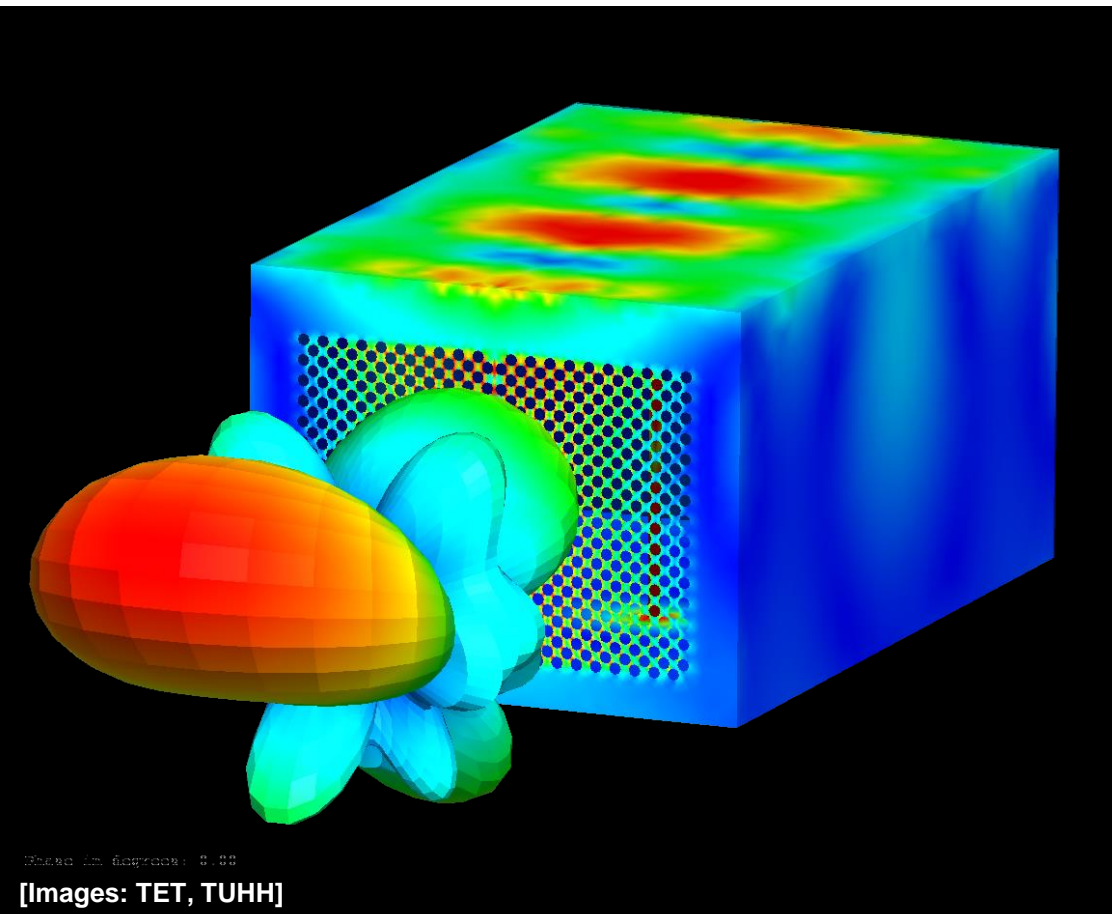


EMC I: Coupling Mechanisms, Countermeasures and Test Procedures

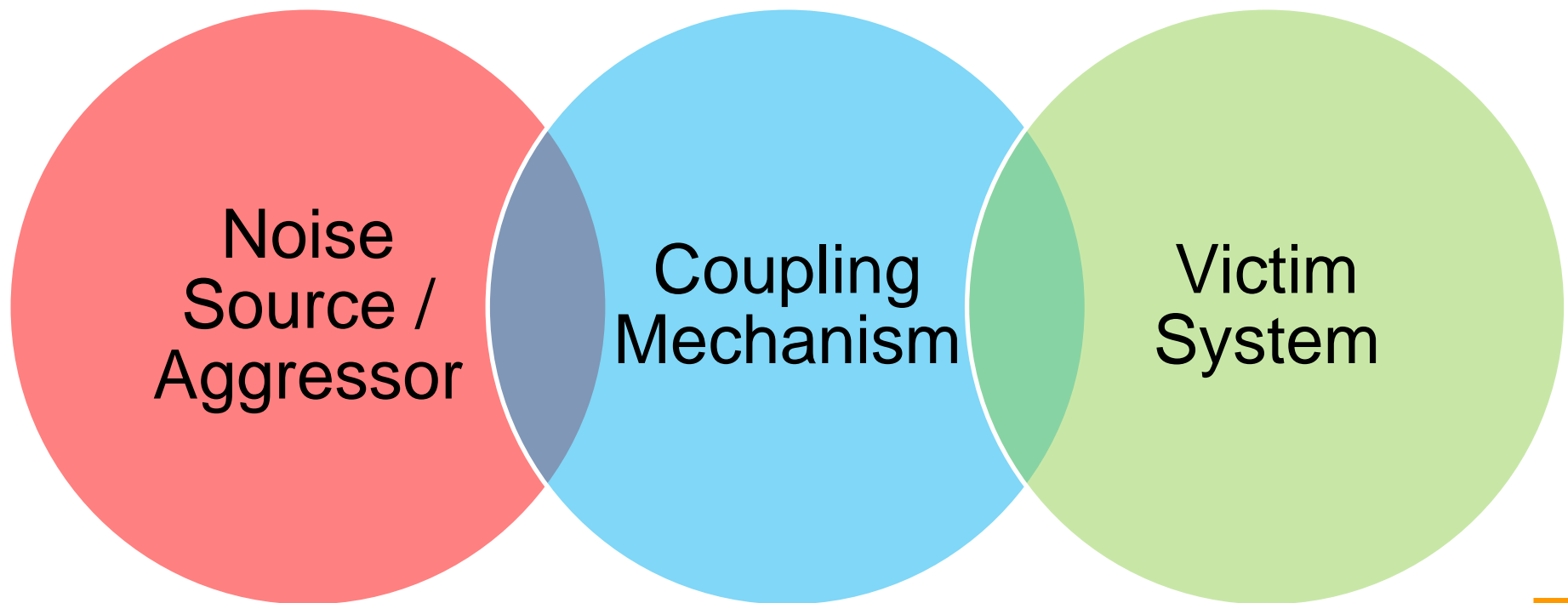
Prof. Dr. sc. techn. Christian Schuster

Course Overview, Summer Term 2023



What This is About

The discipline of **ELECTROMAGNETIC COMPATIBILITY** (EMC) studies the unintentional generation, coupling, and reception of electromagnetic noise, i.e. **ELECTROMAGNETIC INTER-FERENCE** (EMI), and how to measure, control and prevent it.



Goals of This Course

This course will give a broad introduction to the field of Electromagnetic Compatibility (EMC), i.e. the theory and the techniques to analyze, understand, model, and control electromagnetic interference in electronic components and systems.

Specifically, interference sources, coupling mechanisms, shielding, filtering, grounding, and EMC standard test procedures will be discussed. Application examples will come e.g. from aircraft and IC industries.

The topics of signal and power integrity of electronic system will not be covered in this course but in “**Electromagnetic Compatibility II**“ which takes place during the winter term.

Curriculum

Week	Topics	Lecture Notes
1	Course Overview, Introduction to EMC, Classification of Noise Sources, Modeling for EMC	[00] – [03]
2	EMC Standards & Organizations, Review of Resistance Concepts	[04] – [05]
3	Review of Inductance Concepts, Review of Capacitance Concepts	[06] – [07]
4	Galvanic Coupling, Inductive Coupling, Capacitive Coupling	[08] – [10]
5	Generalized Weak Coupling, Radiative Coupling	[11] – [12]
6	Transmission Line Coupling	[13]
7	Overview of EMI Control Techniques, Signal Balancing	[14] – [15]
8	Grounding and Decoupling	[16]
9	General Concepts of Shielding, Low Frequency Shielding	[17] – [18]
10	High Frequency Shielding	[19]
11	Electromagnetic Absorbers, Filters and Surge Protectors	[20] – [21]
12	The Method of Moments in EMC	[22]
13	Testing for EMC, Wrapping Up	[23] – [24]
14	EMC Seminar by Students	

Exercises & Experiments

Exercises will take place bi-weekly on campus. All exercises are „just in time“, i.e. students shall actively work on the task during the exercise under the guidance of the teaching assistant.

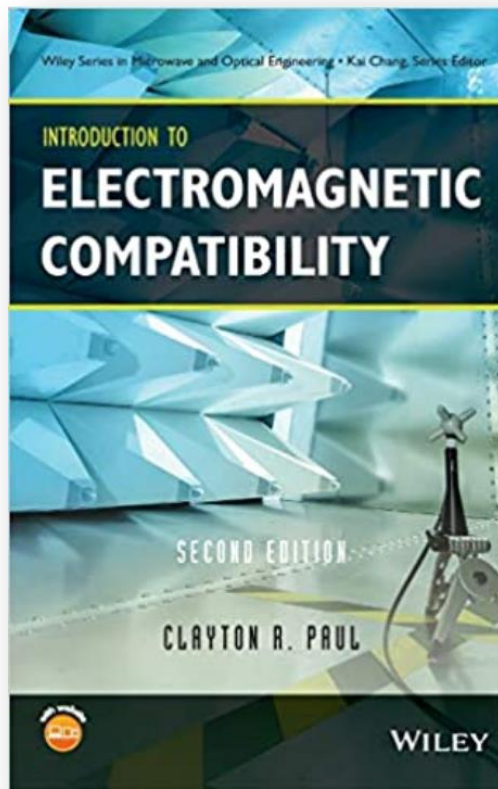
Experiments will take place at the Institute (Blohmstr. 15, 2. OG). Students will have an opportunity to get to know measurement equipment and techniques for analysis of EMC problems. Experiments are to be conducted in groups of two students. Results will be presented in the final week of the semester.



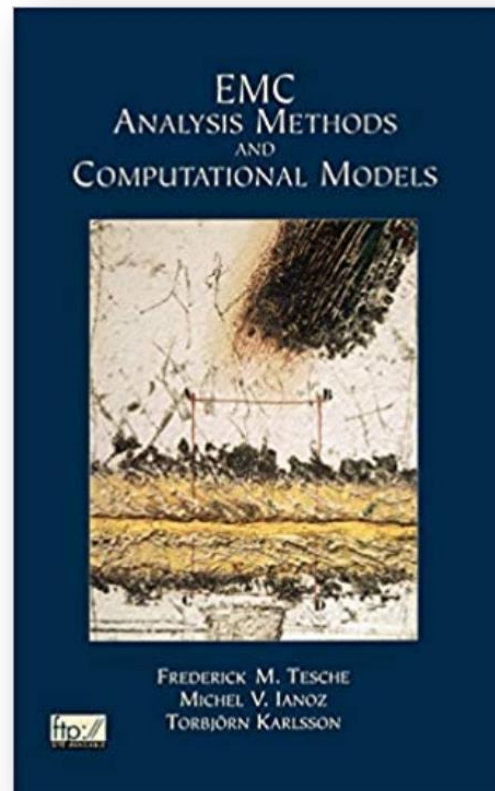
[Image: TET, TUHH]

English Literature

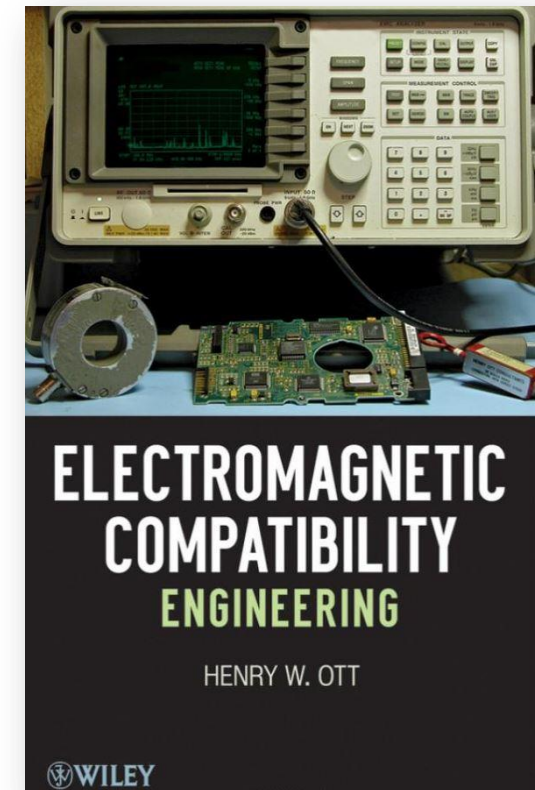
Useful references in English (available at TUHH):



[Source: www.amazon.com]



[Source: www.amazon.com]



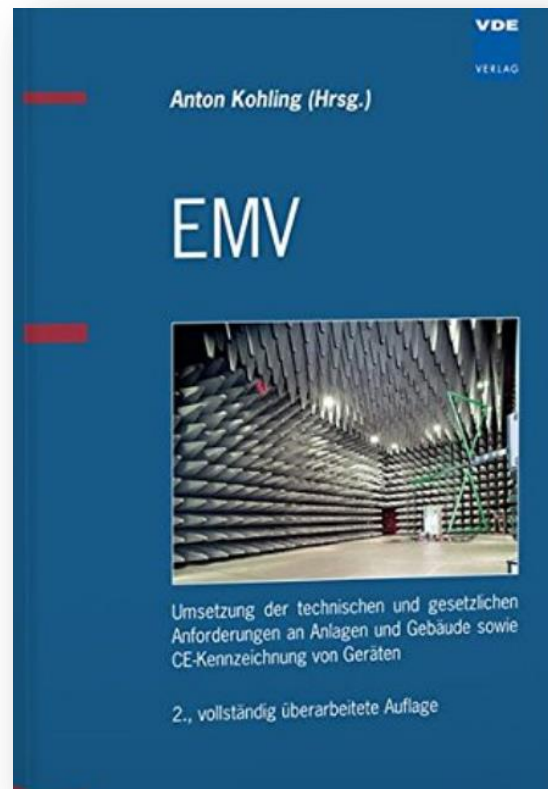
[Source: www.amazon.com]

German Literature

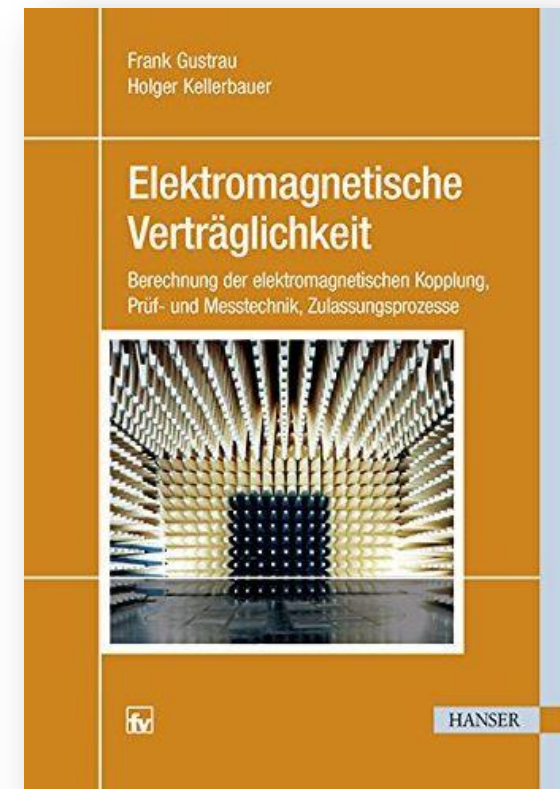
Useful references in German (available at TUHH):



[Source: www.amazon.com]



[Source: www.amazon.com]



[Source: www.amazon.com]