



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

EMC, störningar och störningsbegränsning **EMC, Noise and Noise Reduction**

EEMN05, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED BME

Date of Decision: 2023-04-13

General Information

Elective for: BME5, D5, E4-ss, E4-mt, E4-is, F4, F4-mt, F4-ss, IEA3, N5

Language of instruction: The course will be given in English on demand

Aim

EMC - ElectroMagnetic Compatibility - means that electrical equipment must be able to function as intended without interfering or being interfered by its environment. The minimum requirement is defined by the legislation. Knowledge within this area is essential for everyone that will be active as a designer of electronic systems. The course is intended to give the students a fundamental understanding of how electromagnetic noise is generated and how it affects electronic systems and how it can be reduced to avoid malfunction of the systems. An overview is also given of the standards and directives that are mandatory to be fulfilled by electronic equipment.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Be able to identify different sources and coupling paths of electromagnetic noise.
- Be able to analyse and suggest suitable measures to avoid interference.

Competences and skills

For a passing grade the student must

- Be able to design a simple electronic system where the EMC requirements are fulfilled.
- Be able to perform basic EMC measurements and evaluate those.
- Be able to sort out and acquire information from a comprehensive material, e.g. a text

- book or lab exercise material, with limited reading instructions.
- Be able to orally and in writing communicate and discuss the results of a project.

Judgement and approach

For a passing grade the student must

- Have realised the importance of taking EMC aspects into consideration throughout the complete design process of electronic systems.

Contents

The concept of decibels, Fourier series. Electromagnetic fields. Sources of interference. Cables. Earthing. Balancing and filtering. Screening. Electrostatic discharge. Frequency properties of passive components. Interference in digital constructions. Noise. Standards and directives. CE marking. EMC measurements.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: For grade 3: Passed compulsory parts: Lab exercises including written reports, Project including oral presentation and written report and a short written examination (2 hours). For grade 4 or 5: Larger examination that may be written or oral (5 hours).

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: Elektronik: EITA35 (E), EITF90 (BME, F, N), EITA10 (D) or equiv. Electrical measurements/Sensors: ESSF10 (E, D), EEMF15 (BME), BMEF05 (F), BMEF15 (N) or equiv. EITA40 Circuits and Measurements AND ETEF15 Circuits and Measurements, Advanced Course (IEA)

The number of participants is limited to: No

The course overlaps following course/s: EEM060

Reading list

- Williams T: EMC for product designers. Newnes, 2006.

Contact and other information

Course coordinator: Universitetslektor Johan Nilsson, johan.nilsson@bme.lth.se

Teacher: Johan Gran, johan.gran@bme.lth.se

Course homepage:

<http://bme.lth.se/course-pages/emc-stoerningar-och-stoerningsbegransning/emc-stoerningar-och-stoerningsbegransning/>