FIL3237 Electronic System Design 7.5 credits

Elektroniksystemkonstruktion

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for FIL3237 valid from Autumn 2020

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Enrolled as PhD student at KTH.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the students should be able to:

- Explain and apply basic principles and guidelines of physical architecture design for complex electronic systems, from printed circuits board (PCB) level to higher levels.
- Design PCB's with consideration of signal integrity and impedance matching.
- Analyze and budget the system noise.
- Design power distribution and analyze power supply related noises.
- Design impedance matching network for RF electronic systems.
- Analyze the influence of interconnects at different levels on electronic system performance.
- Analyze EMC/EMI in electronic systems.
- Model the performance of electronic system.
- Discuss sustainability aspects of electronics system design.
- Assemble a PCB with surface mounted and through hole components.
- Design PCB's with consideration of signal integrity and impedance matching.

Course contents

- Evolution of Electronic Systems from Chips to Cabinets
- Printed Circuit Board-Manufacturing and Design
- High Speed & High Frequency Performance: Trace , Via Hole, Connector, Bonding Wire, and Package
- System Noise and Noise Budget Design
- Digital Signal Integrity in High-Speed Electronic Systems
- Power Supply Noise and System Grounding
- Power Distribution System and Decoupling Allocation
- EMC/EMI Fundamentals in Electronic Systems
- EMC/EMI: Common Mode Radiation and Shielding
- RF and Microwave Design Fundamentals
- ESD and Electrical Safety
- Thermal Management
- Specific environments: Space Electronics and Medical Electronics
- Sustainability and Environmental Aspects
- Soldering and use of KiCAD

Examination

- EXA1 - Examination, 7.5 credits, grading scale: P, F

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Oral examination.

Other requirements for final grade

Oral exam and laboratory exercises are required for a passing grade in the course.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.