FEK3150 Topics in Electromagnetic Interactions with Microsystems 3.0 credits

Topics in Electromagnetic Interactions with Microsystems

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

Establishment

The official course syllabus is valid from the spring semester 2026 as decided by the Faculty Board: dnr PA-2026-0008. Decision date: 2026-06-16.

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Recommended:

MSc degree in electrical engineering, technical physics, or equivalent

- basic knowledge in microwave and/or photonics engineering
- basic knowledge in microsystem technology (such as the EK2350 Microsystem Technology Course at KTH, or equivalent)
- ongoing research activities within or related to electromagnetics and/or microsystems

Intended learning outcomes

In the course of these meetings, the student will:

- have learned about the state of the art and research trends in research fields associated to his/her own research field
- have learned to get familiar with new problems related but not exactly within his research field, be able to assimilate new material quickly to reach a certain level of judgement
- have gained deeper understanding the theoretical background of wave propagation phenomena and interaction with microstructures
- have gained insight in modelling electromagnetic microstructures and in judging/questioning the simulation results
- have developed better understanding of the interdisciplinarity of associated fields: i.e. mutuality and differences between microwave systems and photonics engineering for different frequency ranges and applications
- have learned to present a certain topic to an audience which is not directly working on this topic but which is able to question the presented material
- have learned to give and to get feedback on presentations on topics related but not directly within his/her research field

Course contents

The general objective of the course is to create a learning, but also information exchange and discussion forum for graduate students and researchers working with electromagnetic signals in microsystems, including microoptics, photonics, and microwave/RF MEMS. The goal of the course is for the participants to deepen their knowledge in these fields and to gain understanding by giving and listening to presentations and by discussing topics in this field. More specifically, electromagnetic problems with strong focus on the interdisciplinar nature of interactions of microwaves with micromachined geometries of feature sizes both larger and smaller than the signal wavelengths are handled at the different meetings of the course. Individual discussion topics span from theoretical analysis, simulation models, to device characterization and applications.

Examination

- EXA1 - Examination, 3.0 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.

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.