FEI3204 Antenna Theory, PhD Course I 8.0 credits

Antennteori, doktorandkurs I

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

Establishment

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

The course requires basic knowledge of electromagnetism, and it is desirable to have a basic knowledge about radiofrequency technologies. Students who hold an MSc degree in Telecommunication Engineering, Electrical or Electronic Engineering or Physics could potentially have the bases for the development of this course.
Furthermore, basic knowledge of antennas and/or microwave devices is an asset. If the student has already passed the Master course EI2400 (or an equivalent “Antenna Course” in any other University institution), he/she should be in ideal conditions to follow the lectures.

Language of instruction

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

Intended learning outcomes

After completion of the course, the student shall be able to
• Identify the key parameters in any commercial antenna; and to be able to explain the importance of each of these parameters.
• Determine the theoretical limitation of antennas, specifically the link between electromagnetic size, efficiency and bandwidth.
• Define the operation of advanced antennas such as leaky wave antennas, metamaterials antennas, phased arrays and lens based antennas.
• Have scientific discussions about antennas and to identify the strong points and limitations of advanced antennas.
• To identify which are the recent trends of research in the topic and the importance of this research.

Course contents

Antenna theory, physical optics, microwave devices, advanced antennas, metamaterials.

Disposition

Lessons 30 h

Course literature

Basic:
• “Antenna Theory: Analysis and Design”, Constantine A. Balanis, Wiley, 3rd Edition.
• “Antenna Theory and Design”, W. L. Stutzman and G. A. Thiele, 3rd edition.
• “Foundations of Antennas A Unified Approach”, Per-Simon Kildal,
Advanced:
• “The Plane Wave Spectrum Representation of Electromagnetic Fields”, P.C. Clemmow, IEEE Press.
• “Geometry and Light: The Science of Invisibility”, Ulf Leonhardt, Thomas Philbin, Dover, 1st Edition.
Article and notes will be provided during the lessons.

Examination

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.

In the beginning of the course, the student will choose a project which will be supervised by the coordinator of the subject. The coordinator will propose different projects, although the project could be also proposed by the student (however, the coordinator will have to express the consent about the project).
Alternatively, the student can choose not to carry out a project and to go for a final exam (written and oral), in which he/she will have to demonstrate

Other requirements for final grade

Regular home-assignments, including exercises and development of own scripts of simulation.
Additionally, one of the two options will be chosen by the student:
1) Written and oral individual examination.
2) Creation of a written report and oral presentation of a proposed project.

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.