LUNDS
UNIVERSITET
Electrical and Information Technology

Course Program ETEN01 Microwave theory, Vt2, 2015

Literature

Anders Karlsson and Gerhard Kristensson, *Microwave theory*,
(available as hard copy at KF Sigma and as pdf at the course homepage)

Prerequisites

For E: Electromagnetic field theory E (ESS050)
For F: Electromagnetic field theory F (ETE055) or (ETE110)
For Pi: Elecromagnetic field theory Pi (ETEF01)
For others: Basic course in Electromagnetics.

Course responsible

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Home page

http://www.eit.lth.se choose Offered courses (kursutbud) and ETEN01. Everything that is handed out on the lectures is available on the home page.

Lectures

There are two lectures and one problem session per week.
Time and place can be found on schemageneratorn at http://www.student.lth.se/studier/schema/ and also at the course home page.

Laboratory session

A mandatory four hour laboratory session is given in week 4 or 5 in the course. In the session the network analyzer is used for measurements at microwave frequencies. There is also a problem session devoted to the finite element method program COMSOL in week 2.

Assignments and project

The course is examined by three assignments, a project, and an oral exam (for grades 4 and 5). One of the problem sessions in each week is devoted for the hand-out problems. The project is a more comprehensive problem. The project has to be presented orally and also in a written report. At the presentation the students have to give a clear presentation of their results. They should also be prepared to answer questions regarding their results.

Grades

The requirements for the grades are:

3: Laboratory session, assignments, written project report, and oral presentation of the project.

4: Requirements for grade 3 plus oral exam.

5: Requirements for grade 3 plus oral exam.

Plan

Below is a preliminary plan for the course. The project is handed out week 4.

Lectures

Week 1: Basic electromagnetic theory. Impedance. Transmission lines. S-parameters. *Chapters 1, 2, 3.1, 3.3, 3.4*

Week 2: Transmission line parameters. Electromagnetic fields with preferred direction. Waveguides. *Chapters 3.5–3.8, 4, 5.1*

Week 3: Waveguide modes. Analysis of waveguides with COMSOL. *Chapters 5.2–5.4*

Week 4: Losses in waveguides. Excitation of waveguides. Substrate integrated waveguides. Network analyzers. *Chapters 5.5–5.9, 5.12, 5.13*

Week 5: Resonance cavities. Accelerators. *Chapter 6.1, 6.2*

Week 6: Accelerators. Planar dielectric waveguides. Optical fibers. Dielectric resonators. *Chapters 6.3, 8.1–8.4*

Week 7 Optical fibers. Presentation of projects.

Problems Problems for the problem sessions will be handed out each week.