LUNDS
UNIVERSITET
Electrodynamics

Course Program EITN80 Electrodynamics, VT2, 2019

Literature

David J. Griffiths *Introduction to Electrodynamics*,
There are five different editions but any of these can be used.

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 EITN80. Everything that is handed out on the lectures is available on the home page.

Schedule

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.

Examination

The course is examined by assignments and a home exam. There are two assignments during the course. The home exam consists of a set of problems. Some of these are based upon computer programs written during the course and some are based on the software package COMSOL Multiphysics. It is possible to get grade 3 by using these programs. To get a 4 or a 5 some analytic problems have to be solved. The preliminary requirements for the grades are:

3: To solve problems based upon Matlab programs and COMSOL Mutiphysics.

4: Requirement for 3 and correct solutions to two analytic problems.

5: Requirements for grade 4 plus correct solutions to four analytic problems.

Lectures (preliminary)

Week 1: Basic electromagnetic theory. Electromagnetic fields with preferred direction. Introduction to waveguides. Waveguide modes. *Lecture notes*

Week 2: Waveguides and resonance cavities. Introduction to Comsol. *Lecture notes*

Week 3: Accelerators. Lienard-Wiechert Potentials. *Griffiths: Chapter on Potentials and fields*

Week 4: Radiation from accelerating particles. Synchrotron radiation. *Griffiths: Chapter on Radiation*

Week 5: Special relativity. *Griffiths: Chapter on Electrodynamics and relativity*

Week 6: Transformation of electromagnetic fields. Motion of relativistic particles in electromagnetic fields.*Griffiths: Chapter on Electrodynamics and relativity*

Week 7 Motion of relativistic particles in electromagnetic fields. Bremsstrahlung. Cherenkov radiation.*Lecture notes*

The corresponding pages in the different editions of the textbook will be given later.

Problem sessions

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

Computer session

A two hour computer session on COMSOL Multiphysics is given in week 1.

Visit to MAX IV laboratory

A guided tour of MAX IV and ESS will be arranged.