

## TNE083 Antenna Theory – Course information

### 1. Introduction

Wireless communication and other services that require some kind of antenna is very common in the modern society. Almost every portable device; mobile, tablet, laptop etc. does not only have one wireless interface but often two or more wireless services. That means that an antenna is needed for each service in each device, or in some cases a multiband antenna. Moreover, antennas are used in radar systems, broadcasting and so on. The trend is also to build very compact systems, which is a classical antenna design practice violation from performance perspective.

### 2. Textbook

Reference textbook: Constantine A. Balanis, Antenna Theory – Analyses and Design, 2016, Fourth Edition, John Wileys and Sons Inc., ISBN – ISBN-978-1-118-64206-1.

- Older editions of the “Balanis” book are of course ok. However, nicer graphs etc. in the latest edition.

Reference textbook: Foundations of Antenna Theory and Techniques, Vincent F. Fusco, Pearson Education Limited, ISBN 0 130 26267 6.

### 3. General information, course plan and schedule

The schedule is available (When the course period starts.) through “*TimeEdit*” (<https://cloud.timeedit.net/liu/web/schema/>) at the LiU homepage.

“*LISAM*” (<http://lisam.liu.se>) will be used as the primary course administrative system.

### 4. Lectures

A number of lectures will be given. A preliminary list of lecture topics is listed below. Some lecture notes and related lecture/lab material and information can be found at “*LISAM*”.

- Introduction to antennas and general antenna theory
- Antenna theory and technique continuation
- Common antennas
- Antenna design using EDA tools
- Antenna arrays
- System considerations

### 5. Classes

In addition, classes are allocated to elaborate the above topics:

- Theory and technique
- Various antennas
- Array and system perspective

### 6. Lab

Three design and simulation labs, and one measurement lab are planned:

- Microstrip patch antenna design
- Various common antennas
- Antenna arrays
- Antenna measurement using Spectrum analyser, utilizing tracking generator.

## 7. Examination

The examination is composed of two parts:

- 1 point for labs
  - 5 points for the final written examination
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- ❖ The lab part is not graded but active participation in all parts is required to pass that course part. Secondly it should be expected that things learnt, practiced on in the labs might very well appear in the final written exam. The final grade will be the grade acquired in the written exam.
  - ❖ Course specific formula sheet (available on LISAM) “Formula Sheet - Antenna Theory” is allowed in the written exam, print and bring a clean copy (Don’t add any text to it).
  - ❖ Moreover, it is allowed to bring C. Nordling, J. Österman, “Physics handbook”. All problems are possible to solve with the formula sheet, but the handbook can be an aid for some generic physics (basic equations rather than Antenna specific material).

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