Principles of Communication Engineering II

Spring 2009

Prof. Dr. Chen Po-Ning/Prof. Dr. Stefan M. Moser

Syllabus

http://moser.cm.nctu.edu.tw/nctu/pce2/

---

1 Website

There is a website which is always kept up-to-date:

http://moser.cm.nctu.edu.tw/nctu/pce2/

You will find there all necessary information and current announcements about this course as well as PDF-files of handouts and exercises. **We will not handout anything, but you need to download all exercises and handouts from this website yourself!** Note that while the website is available worldwide, the documents can only be downloaded from within the National Chiao Tung University (NCTU) and the National Tsing Hua University (NTHU).

The slides used by Prof. Chen in his lectures can be downloaded from

http://shannon.cm.nctu.edu.tw/comtheory-II.htm

2 Course Objective

The major goal of Principles of Communication Engineering (I,II) is to teach students about the basic principles underlying the operation and design of a communication system. It is a core course in the Department of Communication Engineering. The course will follow approximately the following schedule:

- Passband digital transmission (Chapter 6)
- Spread spectrum modulation (Chapter 7)
- Multiuser radio communications (Chapter 8)
- Fundamental limits in information theory (Chapter 9)
- Error-control coding (Chapter 10)

For more detail see the above mentioned homepage.

We expect a student who finishes the course to be able to understand the basic operating principles of current communication systems or standards. Moreover, we sincerely hope that a student who learns the course material will be equipped with the ability to analyze and design a communication system.

3 Prerequisites

The following lectures/topics are recommended:

- Signals and Systems (preferably)
- Probability (preferably)
- Principles of Communication Engineering I (preferably)

4 Instructors

This course is taught in parallel by two teachers.

Prof. Chen Po-Ning
Engineering Building IV, Office 831
phone: 03-571 21 21 ext. 31670
email: <qponing@mail.nctu.edu.tw>

Prof. Stefan M. Moser
Engineering Building IV, Office 727
phone: 03-571 21 21 ext. 54548
email: <stefan.moser@ieee.org>

Prof. Chen will teach the course in Chinese, while Prof. Moser will teach in English.

5 Time and Place

There will be two lectures per week:

- Chinese class (Prof. Chen):
  - Tuesday, **08:20–10:00** (AB), Engineering Building IV, Room 219 (ED219)
  - Thursday, **15:40–17:40** (GH), Engineering Building IV, Room 219 (ED219)
- English class (Prof. Moser):
  - Tuesday, 10:10–12:00 (CD), Engineering Building IV, Room 303 (ED303)
  - Thursday, 15:40–17:30 (GH), Engineering Building IV, Room 303 (ED303)

The course starts on Tuesday, 24 February, and finishes on Thursday, 25 June. For a more detailed program see the above mentioned website.

6 Office Hours

NCTU requests that every teacher offers two hours per week where students may come to ask questions:

- Prof. Chen: Thursday, 13:30–15:30, Engineering Building IV, Office 831
- Prof. Moser: Thursday, 13:00–15:00, Engineering Building IV, Office 727

However, we would like to encourage you to show up in the teacher's or teaching assistant's office at any time in case you have questions about the class or related subjects. Moreover, we are always available during and after classes.

7 Textbook

The course will mainly be based on

Simon Haykin: *Communication Systems*, 4th ed., Wiley, 2001

Further references and recommended readings:

- Amos Lapidoth: *A Course in Digital Communications*, to be published in 2009.
- Robert G. Gallager: *Principles of Digital Communication*, Cambridge University Press, 2008.
- Thomas M. Cover and Joy A. Thomas: *Elements of Information Theory,* second edition, Wiley, 2006.
- R. E. Ziemer and W. H. Tranter: *Principles of Communications*, 5th ed., Wiley, 2002.
- John G. Proakis: *Digital Communications*, 4th ed., McGraw-Hill, 2001.

For certain topics there will be additional handouts during classes.

8 Exercises

Every week, an exercise will be made available online for download. This exercise will consist of several problems that need to be solved at home and handed in during the class of the following week. A model solution will be available online afterwards.

We believe the exercises to be extremely important and crucial to the understanding of the course. They also serve as a preparation for the mid-term and final exams and we therefore highly recommend to solve them. **To pass the course you need to hand in at least 10 exercises.**

9 Exams

There will be a mid-term exam (two hours) and a final exam (three hours). The exams are going to be open-book. Details about the covered material in the mid-term exam will be published in due time. The final exam will cover everything taught in class.

Moreover, in regular intervals we will make quizzes about the material taught in the previous weeks. A quiz lasts for 10 minutes only and is also open-book.

10 Grading

Your grade will be an average of

- your homework (20%),
- the 6 quizzes (20%),
- the mid-term exam (20%), and
- the final exam (40%).

The grade of the homework will not be based on the correctness of the answers, but rather on the effort the student shows in trying to solve them. This course is worth 3 credits.

11 Special Remarks

The course is taught in parallel in two classes: one class is taught in Chinese, one class is taught in English. We will try to keep the courses pretty much synchronized. In particular, all exercises, handouts, the quizzes, the mid-term, and the final exam will be identical in both classes and written in English only.