Communication Systems II (ECE 742)

Tentative Syllabus

Instructor

Dr. Joerg Kliewer
ECEC 213
Phone: (973) 596-3519
Email: jkliewer@njit.edu
http://web.njit.edu/~jkliewer
Office hours: Wednesday, 1-3pm; or by appointment (recommended)

Overview and prerequisites

ECE 742 covers advanced topics in digital communication systems: maximum likelihood and maximum a posteriori detection (Viterbi and BCJR algorithms), equalization on inter-symbol interference channels, fundamentals of binary error control coding and signal-space coding, fading and diversity. Prerequisite is ECE 642.

Textbook

The *required* text for the term is

   J. R. Barry, E. A. Lee, D. G. Messerschmitt: *Digital Communications (third edition)*, Springer, 2004.

   Additional references are

   - D. Tse and P. Viswanath: *Fundamentals of Wireless Communications*, Cambridge University Press, 2005.

   - J. M. Wozencraft and I. M. Jacobs: *Principles of Communication Engineering*, Waveland Press, 1965.

   - J. G. Proakis: *Digital Communications (forth edition)*, McGraw-Hill Inc.

Tentative Schedule

1. Introduction and limits of communication

2. Review of Pulse Amplitude Modulation (baseband and passband PAM, advanced modulation, OFDM, CDMA)

3. Probabilistic detection (maximum likelihood, maximum a posteriori, Viterbi and BCJR algorithms)

4. Equalization (ZF, linear and DF equalization, ISI and channel capacity)

5. Error control coding (block codes, convolutional codes, turbo codes, LDPC codes, signal space codes)

6. Fading and diversity

For more details see http://web.njit.edu/ jkliewer/wp/ece-742-schedule.

Piazza

We will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates and myself. Rather than emailing questions to me, I encourage you to post your questions on Piazza. Find our class page at http://piazza.com/njit/fall2014/ece742/home.

Assignments and Grading

- Homeworks: There will 8 sets of homework assignments which will be posted each on Moodle. The homework is worth 10% of the final grade and is due at the **beginning** of class. Later assignments will **not** be accepted (**absolutely no exception**).

- Exams: There will be one midterm exam and one comprehensive final exam, both of 150 minutes duration. The exams will be **open book**, **open notes**, calculators will be allowed (no notebook computers). There will be no makeup exams except in the case of serious documented illness. If you have any professional conflicts with these dates and times, you must contact me at least two weeks in advance to arrange to take the exam early.

  - Midterm: Monday, **Oct. 20**.
  - Final: TBA

- Project: For the project, a recent paper will be assigned to each student based on individual interests. A brief report on the paper, possibly including MATLAB simulations, is due before the final.

- Final course grade: The tentative weights used in the grade assignment will roughly be as follows:
  Homework: 10%
  Project: 20%
  Midterm: 30%
  Final: 40%

- Plagiarism and cheating: **Any cheating or plagiarism will result in an automatic F in the course.** The NJIT honor code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.