Electrical Engineering 121
Introduction to Digital Communication Systems

Logistics

- Time and Location: TuTh 9:30-11am, 241 Cory
- Instructor: Professor Kannan Ramchandran
  Email: kannanr@eecs
  Office hours: Tu 11am-12pm, 258 Cory. Or by appointment.
- GSI: Hao Zhang, I-Hsiang Wang
  Email: {zhanghao, ihsiang}@eecs
  Office hours: Hao: M 4:30-5:30pm, 258 Cory
  I-Hsiang: W 11am-12pm, 258 Cory.
- Prerequisites: EECS 120, 126.
- Requirements: Homework 15%, Midterm 1 40%, Midterm 2 45%
  Midterm 1 - March 10th 2011: 7-9pm, 277 Cory
  Midterm 2 - April 29th 2011: 7-9pm, 277 Cory
- Website: resources, homework, and solutions will be posted on bspace.

Course Description
Introduction to the basic principles of the design and analysis of modern digital communication systems. Topics include source coding, channel coding, baseband and passband modulation techniques, receiver design, and channel equalization. Applications to the design of digital of digital telephone modems, compact disks, and digital wireless communication systems.
Course Outline

1. Overview of digital communications.
   Source-channel separation as a layering technique.

2. Overview of source coding, quantization and compression.


4. Communication over Gaussian channels.

5. Communication over bandlimited channels.

6. Codes for communication and storage.
   MDS codes, Reed Solomon codes, codes on graphs, digital fountain codes, Low Density Parity Check codes.

7. Wireless communications.
Homework Policy

- **General:** Solutions will be posted on the course webpage in the evening of the due date. Therefore no late homework will be accepted. Please make a photocopy of your homework (including code for MATLAB problems) and hand in one copy. Please staple your homework and mark on the first page how many pages total are submitted. One lowest homework score will be dropped.

- **Collaboration:** Discussions about homework are allowed and encouraged but each student is expected to write his/her own solutions.

- **Self-Grading and Score Submission:** Students will grade their own homework and submit the score to the TA no later than 10 PM on the following Monday. Graders will grade the copy of the homework submitted. Your scores and the graders’ scores will be cross-checked. If there are inconsistencies, the instructor will be notified, and will take actions accordingly. Please note the department policy on academic dishonesty: http://www.eecs.berkeley.edu/Policies/acad.dis.shtml

  You can get 3 possible scores for a problem, 0, 0.5 and 1. If your solution is entirely correct, you get 1 point. If your solution is more than 50% correct on a single-part problem or you solve at least half the parts entirely correctly for a multi-part problem, you get 0.5 point. Otherwise you get 0 for the problem.

  In the email to the TA to report the score, the title should be of the following format: **EE121HomeworkX** (where X is the homework assignment number). The content of the email should include name, student ID number, and a row of scores (the number of scores should be equal to the number of problems). Please only put spaces between the scores for each problem, i.e. no commas, no semi-colons, no new-lines.

  Example of a student submitting self-graded score for Homework 1, in which there are 6 problems.

  **Title of email:** EE121Homework1

  **Content of email:**

  **Name:** First Last
  **SID:** 10001000
  1 0.5 1 0 1 1