

- Lecture:** Tuesday and Thursday, 12:25-1:45 P.M. in MEB 1208
- Prerequisite:** ECE 5510, *Random Processes*, and ECE 3500, *Fundamentals of Signals and Systems*
- Credit:** 3 hours
- Instructor:** Neal Patwari
- Office:** MEB 3120
- Office Hours:** Monday 4-5pm; Tuesday 3:30-5pm; Thursday 2-3pm; and by appointment.
- Calendar:** <http://www.ece.utah.edu/~npatwari/> click on "Google Calendar"
- Email:** npatwari@ece.utah.edu
- Phone:** (801) 581-5917
- Web Page:** WebCT: <http://webct.utah.edu/>. Homeworks, solutions, readings, and useful web links will be posted here.
Wiki: <http://span.ece.utah.edu/pmwiki/index.php?n=ECE5520>. Projects and an up-to-date schedule are kept here. There is a link from WebCT.
- Software:** Matlab is a required part of the homework assignments and projects.
- Textbook:** Michael Rice, *Digital Communications: A Discrete-Time Approach*, Prentice Hall, 2008. This is a pricey but excellent textbook with lots of practical implementation information. The lowest price I found for it was on Amazon.com. It will be supplemented by my notes.
- Secondary Text:** A. Bateman, *Digital Communications: Design for the Real World*, Addison-Wesley, 1999, ISBN 0-201-34301-0. Excerpts are available on WebCT. I highly recommend reading this book!
- On Reserve:** There will be several textbooks on reserve at the Marriott Library reserve desk.
- Description:** From the ECE Catalog: "Modern communications; probabilistic viewpoint; vector representation of signal; signal spaces; vector channels; additive white Gaussian noise; optimum receivers; maximum-likelihood detection; error probabilities; memoryless modulation methods: PAM, BPSK, M-PSK, FSK, QAM; message sequences; intersymbol interference (ISI); Nyquist signaling; complex baseband models; noncoherent detection." Also: synchronization, source coding, link budgets.
- Grading** Course grades are recorded on WebCT. The final grade is calculated based on:
Homework: 15% (lowest homework score is dropped)
Projects: 25%
Discussion Item: 5%
Two Exams: Best exam 30%, Worst exam 25%
Exam 1: Tuesday, Feb 17, in-class
Exam 2: Thursday, April 14, in-class

Homework: Homework will generally be due on Thursdays at 5pm in the homework locker. The homework locker is located in the hallway on the 3rd floor of the MEB, near the southeast stairwell. Homework will also be accepted up to 24 hours late (5pm on the next day) with a 10% penalty. No homework will be graded after that, since solutions will be posted shortly after the late homework deadline. To allow for extenuating circumstances, the lowest homework score will be dropped when calculating the final grade. Please turn in homework by the regular deadline.

Discussion Item: To provide case-studies of digital communications systems which were designed using the analysis we learn in this class, once during the semester you will present a quick (2 minute presentation, 1-2 page report) on an existing, outdated, or up-and-coming digital communication standard. This report will (1) describe the modulation used in the standard, and (2) why it was chosen, and (3) refer to sources (including at least one peer-reviewed source). The 2-minute in-class presentation will be a quick overview of what you found. We will select topics so that no one overlaps.

Collaboration Policy: You are encouraged to work together on homework assignments. Discussing is a great way to learn. After making a genuine attempt to solve the homework problems, you are encouraged to discuss the answers with other students currently enrolled in ECE 5520 to check the answers and compare problem approaches. However, afterwards, you must complete your answers on your own, without referring to the solutions of other students, solutions from previous terms, or solutions books or sites. When working on Matlab problems, you may not use or copy code written by another student, or provide your code to another student.

Projects: The semester design experience is divided into 6 smaller projects. Each project will build upon the previous project. In this way, you will design a very complicated digital receiver in stages, at each stage ensuring that your design is correct. A couple of projects may take 1-2 hours, while some projects may take only 1/2 an hour. The final project will be the biggest jump, and may take several hours. Project point values, and deadlines, will be posted on the web site. The first project will be due in mid February, after exam 1. Projects will be submitted via WebCT. As with the homework deadline, projects may be submitted up to 24 hours after the original deadline for a 10% penalty.

Grading Scale Tests, projects, and homeworks are designed so that you can demonstrate your mastery of each of the topics within digital communications. Your grade percentage will reflect the percentage of the course topics which you have demonstrated proficiency. Competition is not necessary, since every student can get an 'A' grade. The letter grade is encoded as follows:

	A: ≥ 92	A-: ≥ 90 and < 92
B+: ≥ 88 and < 90	B: ≥ 82 and < 88	B-: ≥ 80 and < 82
C+: ≥ 78 and < 80	C: ≥ 72 and < 78	C-: ≥ 70 and < 72
D+: ≥ 68 and < 70	D: ≥ 62 and < 68	D-: ≥ 60 and < 62

Tips:

1. Read the corresponding section in the book *before* lecture.
2. Come to office hours.
3. Do additional problems, beyond the homework.
4. Start on the projects *early*.

**Disability
Accommoda-
tions**

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.