

ECE 359: COMMUNICATION SYSTEMS I

Instructor: Prof. Venugopal Veeravalli

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Class Time and Place: TuTh 1:30 - 2:50, 165 Everitt Lab

Number of Credits: 3 hours or 0.75 units

Prerequisite: EE 313

Course Web Site: <http://courses.ece.uiuc.edu/ece359>

Office Hours: TBD

Discussion Hour: TBD

Teaching Assistant: Prapti Patel, email: praptihp@uiuc.edu. Office Hours: TBD

Description: This course provides an introduction to analog and digital modulation and demodulation techniques. Topics include: analog signal representation and filtering; analog amplitude modulation (AM) and frequency modulation (FM); digital pulse amplitude modulation (PAM); digital transmission via carrier modulation: amplitude-shift keying (ASK), phase-shift keying (PSK), quadrature amplitude modulation (QAM); fundamentals of random processes, white Gaussian noise; effect of noise on analog modulation techniques; error probabilities for digital transmission through additive white Gaussian noise (AWGN) channel.

Course Text: J. G. Proakis and M. Salehi, *Communication Systems Engineering, 2nd Edition* Prentice-Hall, 2002.

Syllabus

- Review of Signals and Linear Systems (Chapter 2)
- Analog Modulation and Demodulation (Chapter 3)
- Digital Data Transmission (Chapter 7)
- Fundamentals of Random Processes (Chapter 4)
- Effect of Noise on Analog Communication Systems (Chapter 5)
- Effect of Noise on Digital Communication Systems (Chapter 9)
- Introduction to Wireless Communications (Chapter 10)

Additional Reading:

- ★ A. V. Oppenheim, A. S. Willsky and I. T. Young, *Signals and Systems*, Prentice Hall, 1983.
- ★ B. P. Lathi, *Modern Digital and Analog Communication Systems*, 3rd Edition, Oxford University Press, 1998.
- ★ S. Haykin, *Communication Systems*, 4th Edition, Wiley, 2001.

All of these books have been put on reserve in the Engineering Library. Further supplemental reading material may be put on reserve during the course of the semester.

Other useful information, including all of the course handouts, will be available on the course web site.

Exams and Grading:

Class participation	5%
Home-work	15%
Exam 1	20%
Exam 2	20%
Final Exam	40%

Class participation will be evaluated based on attendance; questions that you ask in class, after class, or via e-mail; and self initiated work that goes beyond what is required by the class.

Homework problems will be assigned every week, except for the exam weeks. There will be a total of 11 assignments. Late material will not be accepted unless prior arrangements are made with me at least 1 day in advance.

Some of the homework assignments will include a simulation experiment using Matlab's Simulink Package. These assignments will not be graded, but doing them will greatly help in understanding the material taught in class.

Exam 1 will be held on February 25 and Exam 2 will be held on April 10 in class.

The final exam will be held on Tuesday, May 13 from 1:30-4:30 PM.