

EE 511 Course Syllabus

Introduction to Communication Systems

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Class Hours and Location: 11:00am-12:15pm TuThr, FPAT 265.

Text: Principles of Communications, Systems, Modulation, and Noise by R. E. Ziemer and W. H. Tranter, 6th Edition.

Office hours: 3:15pm-4:30pm Tuesday and Thursday.

TA: Jingjing Yu, E-mail: jyu5@uky.edu

Course is compliant with Departmental Baseline [EE511 Syllabus](#):

Outcomes

Students completing this course should demonstrate the:

1. Ability to analyze basic communication systems involving random signals, filtering, sampling, and modulation.
2. Ability to design basic communication systems.
3. Ability to describe the reasoning behind design decisions.

Class Content and Objective:

The content of "Communication Systems" represents the basic knowledge necessary for transmitting and receiving information using today's communication technologies. The techniques that will be studied involve coding information onto a carrier (modulation) which is then transmitted. The received signal is then decoded (demodulated) yielding the original information. Emphasis will be given to analog modulation of both analog and digital signals.

This course will cover the concepts associated with the Fourier transform, active filtering, spectral analysis, sampling theory and signal modulation/demodulation. Filter design will include active higher order bandpass, lowpass, highpass and linear phase filtering. Matched filtering and quadrature detection for binary demodulation will be studied. Sampling theory will cover impulse, natural and sample and hold types of sampling design. The modulation techniques covered will include Amplitude Modulation (AM), Frequency Modulation (FM), Time-Division Modulation (TDM) and Frequency Shift Keying (FSK). Time permitting, additional material on scalar wavefront models will be introduced and applied to beam forming of acoustic, electromagnetic and coherent (laser) light waves. Homework will be in the form of problem sets and MATLAB based visualizations. Emphasis will be placed on chapter 2, Signal and Linear Systems, and chapter 3, Basic

Modulation Techniques. There will be selected material from chapter 4, Principles of Baseband Digital Data Transmission and other chapters as time permits.

Grading Policy:

- Homework: 25%: Once a week, Due one week after assignment, No late homework, drop the lowest 1. Assignments may include MATLAB visualizations.
- Exam 1: 25% (Date to be announced, closed book, 1 page crib sheet).
- Exam 2: 25% (Date to be announced, open book).
- Final Project: team MATLAB Simulation, 25% (Due Thursday of Finals Week, 9pm, 12/18/08)
- In accordance with SACS Recommendation 10 in the Provost memo dated March 12, 2004, graduate students will have a different grade scale than undergraduate students.

Reference:

1. Digital and Analog Communication Systems by Leon W. Couch, 7th Edition.
2. Principles of Communications, Systems, Modulation, and Noise by R. E. Ziemer and W. H. Tranter, 6th Edition.
3. Introduction to Fourier Optics by J. W. Goodman, McGraw Hill.
4. Digital Communication by E. A. Lee and D. G. Messerschmitt.
5. Digital Transmission of Information by R. E. Blahut.
6. Introductory Probability and Statistical Applications by P. L. Meyer.
7. Probability and Statistics by M. H. DeGroot.
8. Discrete-Time Signal Processing by Oppenheim and Schaffer.
9. Digital Communication Systems by Simon Haykin.
10. An Introduction to Analog & Digital Communications by Simon Haykin.
11. Communication Systems by Simon Haykin, Second Edition.

Equipment Required: Access to MATLAB, email and the web.

Infrastructure Required: The students will be required to obtain computer accounts to enable them to communicate with email (probably ewl), run MATLAB (probably ewl) and read web pages. For home access, the students may want to get special accounts (probably pop). Communications to the students will be done by the EE511 web page and also through the EE511 email list. Individual correspondence by email will be encouraged.