

Course title	ELE 435 Communication Systems (3 Cr) With ELE436 Lab (1 Cr)
Catalog description	(I,4) Representation of signals and noise. Basic principles of modulation and demodulation. Waveform and digital transmission systems. Design of a component of a communication system.
Prerequisite	ELE 313 and 314
Text book	<i>Leon Couch II, Digital and Analog Communication Systems</i> , 7 th edition, 2007, Prentice-Hall/Pearson, Upper Saddle River, NJ 07458.
Course Objectives	<p><u>To Understand</u> – Understand communication theory, information theory, communication channels, communication system components, and statistical properties of communication systems, and modulation methods.</p> <p><u>To Question</u> – Think critically of design tradeoffs in communication systems based on the analysis of information, frequency and statistical properties.</p> <p><u>To Design</u> – Conduct an independent project on signal processing and/or components of communications systems.</p> <p><u>To Communicate</u> – written report of the final project.</p>
Topics covered	<p>Communication theory is the study of the representation, transmission and reception of <i>information</i> (e.g. speech, music, text, images etc.) using electrical/acoustic signals and systems. Specifically we will be concerned with two types of problems in this course: 1) how to code and transmit information across a communication channel (cable, wires, space, waveguide etc.) and 2) how to analyze and reduce the interference and noise that distort the transmitted signals. We will use Fourier transform methods (learned in ELE 313/314) and ideas from probability to understand various communication systems. By the end of the course, the student should have an understanding of analog (AM and FM), analog-pulse (PAM) and digital-pulse (PCM/FSK/ASK) modulation methods.</p>
Class Schedule	<p>Class meets for 2 sessions, 2.5 hrs/week of Lectures and 3hrs/week of Lab</p> <ol style="list-style-type: none"> 1. Lecture: 40 hours 2. Exams: 6 hours 3. Lab and Matlab Experiments
Course Outcomes	<ol style="list-style-type: none"> 1. Knowledge about the theory of communications; representation, transmission and reception of information; frequency and statistical properties of communication systems; communication channels including cable, wires, space, and waveguide; analysis and reduction of interference and noise in transmitted signals; analog (AM and FM), analog-pulse (PAM) and digital-pulse (PCM/FSK/ASK) modulation methods. (a) 2. An independent Telecommunication Instructional Modeling System (TIMS)-based design project on signal processing and/or components of communications systems, including a written report. (c,e,g,k,l)
Assessment Methods	<ol style="list-style-type: none"> 1. Examinations: exam 1 (15%), exam 2 (15%), final comprehensive exam (40%) 2. Quizzes/homework (0%) 3. Lab Experiments and Matlab Project (30%)

Relationship of course to program objectives

1. Produce graduates who can practice electrical engineering to serve state and regional industries, government agencies.
2. Produce graduates with the necessary background and technical skills to work professionally in communication systems.
4. Prepare graduates who are capable of entering and succeeding in an advanced degree program in the field of communications.

Contribution of course to professional component

Engineering science: 3 credits
Engineering design: 1 credit

Accommodations

Any student with a documented disability is welcome to contact me as early in the semester as possible so that we may arrange reasonable accommodations. As part of this process, please be in touch with Disability Services for Students office at 330 Memorial Union. 874-2098

Revised by

Ramdas Kumaresan

Date

September 1, 2009