Course Outline

Instructor
- Prof. Pradeepa Yahampath, P.Eng.
  E1-536 EITC
  (204) 474-8784
  Pradeepa.Yahampath@umanitoba.ca

Office Hours
- Monday, Wednesday, Friday
  11:30am–12:30pm
  or by appointment

Teaching Assistant
- TBD

Contact Hours
- 4 credit hours
- Lectures
  3 hours × 13 weeks = 39 hours
- Laboratories
  3 hours × 5 weeks = 15 hours

Prerequisites:
- ECE 3780 Signal Processing 1
- STAT 2220 Contemporary Statistics for Engineers

Course Website:
http://ece.eng.umanitoba.ca/undergraduate/ECE4260

ECE 4260 – Communication Systems

Course Objectives

The course is intended to provide an introduction to modern analog and digital communication systems. The main topics covered include the fundamentals of analog and digital modulation, modeling random signals, noise in communication systems, and elements of digital receivers. Laboratories provide hands-on experience with circuits and measurement instruments as well as an introduction to communication system simulation using Matlab/Simulink.

Course Content

The following topics will be covered:

- Introduction to communication systems; analog vs. digital transmission; concepts of transmitter power and bandwidth; limitations of communication channels; performance measures such as SNR and BER
- Analog modulation techniques (AM, FM, and PM)
- Digital modulation techniques (ASK, PSK, QAM, and FSK)
- Review of probability theory with applications to communication systems
- Introduction to random processes; modeling of random signals and noise; correlation function, power spectrum, and linear filtering of random signals
- Digital receivers for Gaussian channels; elementary binary detection theory for polar and orthogonal signalling.

Textbook

Required Readings for ECE4260 Communications Systems (course pack), available in the Bookstore.

Other References


Requirements/Regulations

- Attendance at lectures and laboratories is essential for successful completion of this course. Students must satisfy each evaluation component in the course to receive a final grade.
- It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with the University’s General Academic Regulations, as well as Section 3 of the Faculty of Engineering Academic Regulations dealing with incomplete term work, deferred examinations, attendance and withdrawal.
- No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, wireless communication or data storage devices) are allowed in examinations unless approved by the course instructor.

Important Dates

- Term Tests
  February 12th, 2015, 6:00pm-8:00pm

- Voluntary Withdrawal Deadline
  March 19th, 2015

- Mid-term Break
  February 16–20, 2015
  No classes or examinations

- Good Friday
  April 3rd, 2015
  No classes or examinations
Learning Outcomes

1. Describe the role of important elements of a modern communication system.
2. Analyze analog and digital modulation techniques by using signal processing tools.
3. Solve simple problems involving random signals, noise, and linear systems by using basic tools of probability and random processes.
4. Analyze the effects of channel noise on simple communication systems.
5. Identify (and justify the suitability of) a modulation technique for a given application scenario.

Expected competency levels

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Evaluation

The final course grade is determined by the student's performance on assignments, in laboratories, and on examinations. Students must complete all the laboratories in order to be eligible to receive a passing grade.

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<th>Component</th>
<th>Value (%)</th>
<th>Method of Feedback</th>
<th>Learning Outcomes Evaluated</th>
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* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations on Academic Integrity, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating by another student is also subject to serious academic penalty.