University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ELEC 450 – Communication Theory and Systems II

Term – SUMMER 2015 (201505)

Instructor

Dr. Xiaodai Dong
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Office Hours

Days: Thursdays
Time: 1pm-2pm
Location: EOW-439

Course Objectives

- The objectives of the course are to introduce the fundamental theories of digital communications and the components of digital communication systems. This course lays the foundation for communications specialization.

Learning Outcomes

- a) Understand the basic concepts of energy signals and power signals, autocorrelation function, power spectral density of random signals

  b) Convert an analog source to digital signals by sampling and quantization, analyze quantization error, and compare uniform and non-uniform quantization

  c) Understand pulse coded modulation and other baseband transmission schemes, understand the different properties of these modulation schemes

  d) Grasp the basic idea of signal space and the concepts of signal distance, orthogonality, energy, and perform Gram-Schmidt orthogonalization on a set of signals

  e) Know how to characterize the additive white Gaussion noise channel

  f) Have full knowledge of basic digital modulation schemes such as ASK, PSK, QAM and FSK

  g) Understand the whole transmitter chain including pulse shaping

  h) Design optimum receivers based on matched filtering and optimum decision rules

  i) Analyze the performance of various digital modulation schemes

  j) Know the operating principle of differential encoding/detection and non-coherent receivers

  k) Design pulse shapes to avoid intersymbol interference in a bandlimited channel

  l) Have basic idea of channel equalizer

Syllabus

- a) Introduction, signals and spectra review, probability review
  b) Formatting and baseband transmission
  c) Bandpass modulation and signal space
  d) Optimum receivers in additive white Gaussian noise channels
  e) Differential encoding/detection and non-coherent receivers
  f) Channel equalization

A-Section(s): A01, A02 / CRN 30335, 30336
Days: Mondays and Thursdays
Time: 10am – 11:20am
Location: CLE A202

B01 Tue 14:30-17:20 starting May 26, 2015
B02 Tue 14:30-17:20 starting June 2, 2015
Labs happen every two weeks

Required Text

Title: Digital Communications Fundamentals and Applications
Author: B. Sklar
Publisher: Prentice Hall
Year: 2nd edition, 2001

Assessment:

Assignments:	10%	
Labs	15%	
Mid-term	30%	Date: June 25, 2015
Final Exam	45%	

Note:

Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.
Failure to pass the final exam will result in a failing grade for the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance
http://web.uvic.ca/calendar/GI/GUPo.html

Policy on Inclusivity and Diversity
http://web.uvic.ca/calendar/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult entry in current Undergraduate Calendar for the UVic policy on academic integrity.

http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.