Old Dominion University
Batten College of Engineering and Technology
Department of Electrical and Computer Engineering

ECE 787/887 – Digital Communications – Fall 2013
Course Syllabus

Course Description: ECE 787/887 – Digital Communications (3 credits). This is a graduate level course that covers fundamental concepts of digital communication systems including: introduction to formal theoretic and signal space concepts; digital modulation techniques (PAM, QAM, PSK, FSK, etc.); optimal detection of symbols and sequences; encoding and decoding of information for efficient transmission, noise rejection.
Prerequisites: ECE 451/551 or equivalent, or permission of the instructor.
Prerequisites by topics: signals and linear systems; probabilities, random variables, and stochastic processes; basic understanding of communication systems.

Instructor:
Dr. Dimitrie C. Popescu.
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Course Goals and Objectives:
1. To gain factual knowledge about digital communications (terminology, classifications, and methods specific to digital communications).
2. To learn fundamental principles of digital communication systems.

Textbook (required):

Course Topics:
1. Introduction to digital communication systems (Ch. 1).
2. Review of probabilities and stochastic processes (Ch. 4).
3. Information sources and source coding (Ch.6).
4. Coding for discrete sources (Ch. 6).
5. Coding for analog sources. Quantization (Ch. 6).
6. Baseband and bandpass representations for communication signals and systems (Ch. 2).
7. Signal space concepts (Ch. 7).
8. Digital modulation schemes and signal constellations (Ch. 7).
9. Receivers for digitally modulated signals (Ch. 7).
10. Optimum receivers and probabilities of error for AWGN channels (Ch. 7).
11. Digital transmission through bandlimited channels (Ch. 8).
12. Multicarrier modulation and OFDM (Ch. 8).
13. Mathematical modeling of communication channels (Ch. 9).
14. Channel capacity (Ch. 9).
Additional textbook recommended for computer experiments (NOT required):


Evaluation:

1. Two in class exams, each with 35% weight in the final grade.
2. Homework: 20%
3. Computer experiments: 10%

Course policies:

- Both 700 and 800 levels use the same study materials; however, a more in depth understanding of the material is expected from 800 level students. To differentiate between levels additional questions may be given to 800 level students in homework and/or exams.
- Homework must be handed in-person to the instructor at the beginning of the lecture on the day it is due. Late homework will not be accepted; however early submission is acceptable provided homework is handed in-person to the instructor.
- Students are expected to have read and follow the ODU Honor Code. Cheating is absolutely prohibited. Students may discuss problem assignments with each other; however, submitted assignments are expected to be original work. Identical homework solutions from different students are not acceptable and will be penalized by taking off points from the full credit.
- Exams will be closed-books closed-notes, and only a “cheat sheet” with handwritten formulas may be used. Details on how to prepare this sheet will be given in the lecture before the first exam. Students are not supposed to receive or give assistance on their exams.

Class Schedule for Fall 2013:
Meeting time and place: Thursday 7:10 – 9:50 pm in Kaufman 215.
Office hours: Thursday 5:30 – 7:00 pm, or by appointment.

Exam Schedule for Fall 2013:
Exam 1: October 17, in class during lecture time, one period only.
Exam 2: December 5, in class during lecture time, both periods.
Final exam: no final exam will be administered during the final exam week.