

EE 578 – Simulation of Comm. Systems

COURSE OUTLINE

(082)

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TEXT:

Handouts and Lecture Notes

GRADING POLICY:

- Quizzes: 15%
 - HW: 15%
 - Midterm: 25%
 - Project: 20%
 - Final Exam: 25%
- **Official Excuses:** Only excuses obtained from Students Affairs Dept. are accepted. Personal excuses are not accepted.
 - **No make-up** tests will be provided. If an official excuse exists, the student will be given the average of his grades.

References:

- 1- William Tranter, K. S. Shanmugan, T. S. Rappaport, and K. L. Kosbar. *Principles of Communication Systems Simulation with Wireless Application*. Prentice Hall 2004.
- 2- Michel Jeruchim, P. Balaban, and K. S. Shanmugan. *Simulation of Communication Systems modeling, Methodology, and Techniques*. Springer, second edition, 2000.
- 3- J. G. Porakis and M. Salehi, *Contemporary Communication Systems Using MATLAB*,

W	D	Date	Topics
1	S M	11 Oct 13 Oct	Introduction to Simulation Methodologies (Motivation, Basic techniques)
2	S M	18 Oct 20 Oct	Filter Models (IIR and FIR structures, discrete integration, the bi-linear z-transform)
Quiz 1: Saturday 25 Oct			
3	S M	25 Oct 27 Oct	Noise Generation and Modeling (Congruence algorithms, PN sequence generators, testing uniform number generators)
4	S M	1 Nov 3 Nov	Noise Generation and Modeling (mapping to target probability density functions, mapping to target power spectral densities, noise bandwidth of discrete-time structures)
Quiz 2: Saturday 8 Nov			
5	S M	8 Nov 10 Nov	Signal Set Level Simulation (Signal Constellation, Average Energy, SNR, Monte Carlo Estimation)
6	S M	15 Nov 17 Nov	Signal Set Level Simulation (case study: VBLAST MIMO Simulation)
7	S M	22 Nov 24 Nov	Midterm Take Home Exam
8	S M	29 Nov 1 Dec	Waveform Level Simulation (Binary systems, Pulse Shaping, M-ary systems, simulation architecture, interpretation of simulation results and sanity checking)
9	M W	15 Dec 17 Dec	Graphical Simulation Products (Signal constellations, D/Q signal plots and eye diagrams, phase-plane plots, probability density function estimation and histograms, power spectral density estimation)
10	S M	20 Dec 22 Dec	Waveform Channel Models (Multipath and fading, flat-fading models, frequency-selective fading models, interference)
Quiz 3: Saturday 27 Dec			
11	S M	27 Dec 29 Dec	Discrete Channel Models (Discrete Channel Models, Hidden Markov Models, Baum-Welch algorithm)
12	S M	3 Jan 5 Jan	Fast Simulation Techniques Semi-Analytic, Important Sampling
13	S M	10 Jan 12 Jan	Case Study: TBD
14	S M	17 Jan 19 Jan	Project Presentation and Submission
15	S M	24 Jan 26 Jan	Final Exam (Take Home)
16	S	31 Jan	Last Day for Classes
1 – 11 Feb			Final Examination