STAT/ELEC 321

2016-2017

Note: Formerly STAT 357/EECE 357. Students may not received credit for STAT/EECE 357 *and* STAT/ELEC 321. Note that STAT 321 and ELEC 321 are equivalent and students may register for either.

Topics to be covered:

* Probability: Basic axioms, definitions. Conditional probability

* Random variables and vectors: Bernoulli, binomial, Poisson, Gaussian,
  Statistics of random variables: expectations, second order
  statistics, higher order moments

* Uncorrelated and independent random variables

* Functions of random variables - scalar and vector valued functions

* Conditional densities, Bayes rule

* Limit theorems: LLN and CLT - basic understanding of convergence
in probability and convergence in distribution

* Binary Hypothesis testing with examples

* Stochastic Simulation
  Simulation of rv
  Inverse transform Method
  Acceptance Rejection Method
  Simulation of Gaussian rv
  Composition method : example simulating a predictor for stock
  market or target

* Random processes: IID processes
  Example: Law of large numbers and Shannon's source coding theorem

* Basic information theory: entropy, Source coding: how to compress
  information, Example: Huffman Code

* Markov chains: Definition, basic properties, irreducibility, recurrence,.
Examples: maneuvering targets, social networks

* Least Squares inference, unbiasedness and mean square consistency of stochastic least squares

Examples: Channel equalization, deconvolution.

Assessment:

- 4 assignments: 10% each, total 40%
- midterm test: 1 hour exam, 20%
- final exam: 1 hours exam, 40%