

Random Process, ECE6601

Instructor: Chuanyi Ji, ECE, Gatech

Time/Location: TBA

Office hrs: TBA

Course objective: To study basic theory and principles of random processes, and application examples.

Course Outline:

- *Review of basic probability: probability spaces, random variables, distribution and density functions, expectation, characteristic functions, conditional probability, conditional expectation
- * Sequences of random variables: laws of large numbers, central limit theorem
- * Random vectors and estimation: random vectors, covariance characterization, jointly Gaussian random variables, orthogonality principle, minimum mean squared error estimation, Kalman filtering
- * Basic concepts of random processes: definition and classification, stationarity and ergodicity, correlation functions, continuity, differentiation, and integration of random processes
- * Representations of random processes: sampling theorem, Karhunen-Loeve expansion
- * Special processes: Markov processes, Wiener process, Poisson processes, shot noise, random walk
- * Random processes in linear systems and Wiener filtering: spectral analysis of random processes in linear systems, the orthogonality principle, Wiener filtering

Text: A. Papoulis and S.U. Pillai, Probability, Random Variables and Stochastic Processes, McGraw-Hill, 2002

References

B. Hajek, Lecture notes

A. Leon-Garcia: Random Processes for Electrical Engineering

Grade Composition: Homework 20%, midterm exam 35%, final exam 45%