ECE 604 Stochastic Processes
Fall 2022

Instructor: Weihua Zhuang, EIT 4156, x35354, email:wzhuang@uwaterloo.ca

Lectures: Wednesdays, 11:30am-2:20pm, EIT3141

Office Hour: Wednesdays, 2:30-3:30pm @ EIT 4156

Prerequisite: ECE206 or equivalent (subject to the approval of instructor)


This course studies fundamentals in probability theory and random processes. It is strongly recommended that students in communications, networks, signal processing, control, and other related areas should take this course.

Course Outline:

- Review: probability and conditional probability, random variables, probability density function, probability mass function, cumulative distribution function, mean and variance, moment generating functions.

- Convergence concepts: convergence in mean square, convergence almost everywhere, convergence in probability, convergence in distribution.

- Markov chains: Chapman-Kolmogorov equations, time reversibility, Markovian decision process.

- Poisson processes: exponential distribution, Poisson process, generalization of the Poisson process.

- Continuous-time Markov chains: birth and death process, transition probability function, time reversibility, uniformization.

- Renewal processes: limit theorems, renewal reward process, regenerative process.

- Stationary processes: Brownian motion, white noise, Gaussian process, stationary process.

Grading: Midterm Examination = 30%, Final Examination=70%.

References for Chapters 1-3 (reserved in DC library):