ECE 604 Stochastic Processes
Fall 2020

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

Course Website: https://learn.uwaterloo.ca

Lectures: ███ virtual lectures, with lecture notes and weekly lecture videos available at the course website

Prerequisite: An introductory course in probability such as ECE 206

Text: Sheldon M. Ross, Introduction to Probability Models, 11th ed., Academic Press, 2014

This course studies fundamentals in probability theory and random processes. It is strongly recommended that students in communications, networks, signal processing, power systems, 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.

Grading: Quizzes, homework, final exam.

Homework: Assignments are selected problems from the textbook; answers will be provided.

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

- Ian F. Blake, An introduction to applied probability, 1979 (call number: QA273.B586 1987)

- Sheldon M. Ross, A first course in probability, 9th ed., 2012 (ISBN10: 1-292-02492-5)

- Athanasios Papoulis, Probability, Random Variables, and Stochastic Processes, 2002 (QA273 .P2 2002)