

Statistics 433/533
Introduction to Stochastic Processes
Professor J. Michael Steele

Prerequisites: Knowledge of the material of Statistics 430 is required. Students will also need to have a solid understanding of calculus of one and several variables. Some knowledge of matrix algebra and determinants is also required. We will use the statistical programming language R; some programming experience is expected but R programming is not a formal prerequisite.

If you have not had Statistics 430, then you need the permission of the instructor to enroll.

Required Texts:

- *Introduction to Stochastic Processes with R* by Robert Dobrow (John Wiley and Sons, NY, 2016)

Intellectual Scope: The core task is to lay the foundation for the mastery of the technology of stochastic process, especially Markov chains, Markov processes, Poisson processes, birth death processes, and branching processes. We will also develop some of the methodology of martingales. While the focus is on the development of fundamental skills and the mastery of key theoretical and simulation concepts, this is done with the expectation that most students will have in mind the applications of these tools in problems of business processes, manufacturing processes, information technology, service industries, and finance. The course is particularly suitable for students who intend to do further work in the areas of operations research, operations management, economics, finance, applied mathematics, or statistics.

Grading: There will be weekly homework that will count for 35% of the grade. There will also be two in-class mid-term that will count for a total of 40% of the grade. There will be a final project that will count for 25% of the grade.

Academic Integrity: Students are expected to be scrupulously attentive to principles of academic integrity of the University of Pennsylvania.

Further Information: Further course information will be provided via Canvas.