

Spring 2018  
Department of Applied Mathematics and Statistics,  
Stony Brook University  
**AMS 550: Stochastic Modeling and Analysis**

INSTRUCTOR: Jiaqiao Hu  
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**Course Description:** Includes Poisson processes, renewal theory, discrete-time and continuous-time Markov processes, Brownian motion, applications to queues, statistics, and other problems of engineering and social sciences. This course is offered as both MBA 550 and AMS 550. Prerequisite: AMS 507 or equivalent.

**Learning Objectives:** Upon successful completion of this course, students should be able to:

- demonstrate an understanding of the concepts in Poisson processes.
- demonstrate an understanding of the concepts in discrete time Markov chains.
- demonstrate an understanding of the concepts in renewal processes.
- demonstrate an understanding of the concepts in continuous time Markov chains.
- demonstrate an understanding of the basic concepts in queueing theory.

**Text Book:** Sheldon M. Ross, *Introduction to Probability Models (10th or 11th ed.)*, Elsevier.

**Topics to be covered:** Chapter 1 through Chapter 8, specific topics include: review of probability theory, Poisson processes, renewal processes, discrete-time Markov chains, continuous-time Markov chains, and queueing theory.

**Prerequisites:** Students are required to have a strong background in probability theory (for example, have taken AMS507 or equivalent courses) and multivariate calculus.

**Homework:** Homework will be assigned on a weekly basis, and will be due at the beginning of class on the due date. The lowest score will be dropped before calculating your average. No late homework will be accepted. For full credit, please write down all intermediate steps needed, not just final answers.

**Exams:** There will be two exams (a midterm and a final, time and location of the midterm will be announced in class two weeks prior to the exam date). All exams will be in class, closed notes and book. A letter-sized *hand-written* (not typed or xeroxed) formula sheet and a calculator will be allowed in the exams.

**Grading Policy:** Your total average score will be calculated based on 20% homework, 40% midterm, and 40% final.

**Disability Policy:** If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site <http://www.ehs.sunysb.edu/fire/disabilities.asp>.

**Academic Integrity:** Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more

comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

**Critical Incident Management:** Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.