Fall 2018
Department of Applied Mathematics and Statistics,
Stony Brook University
AMS 553: Simulation Modeling and Analysis

INSTRUCTOR: Jiaqiao Hu
CLASS: Mondays and Wednesdays 4:00pm-5:20pm, Melville LBR W4550
OFFICE: Math Tower 1-107
PHONE: (631)6328239
EMAIL ADDRESS: jqhu@ams.sunysb.edu
OFFICE HOURS: Mondays 1:30pm -3:30pm
COURSE WEBSITE: `www.ams.sunysb.edu/~jqhu/courses/553/AMS553.html`

Course Description: A comprehensive course in formulation, implementation, and application of simulation models. Topics include data structures, simulation languages, statistical analysis, pseudorandom number generation, and design of simulation experiments. Students apply simulation modeling methods to problems of their own design. This course is offered as CSE 529, AMS 553, and MBA 553.

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

- understand the basic structure of random number generators.
- understand the working principles of different random variate generating algorithms.
- apply statistical tools to describe and analyze a given input data set.
- apply statistical tools to analyze a simulation output process.
- apply variance reduction techniques to different situations to improve the statistical efficiency of simulation.

Text Book: A.M. Law *Simulation Modeling and Analysis (4th or 5th ed.), McGraw-Hill.*

Topics to be covered: Chapters 1, 4, 6, 7, 8, 9, 10, 11, and 12, specific topics include: review of probability theory, random number generation, random variate generation, selection of input distributions, output analysis, variance reduction techniques, and an introduction to simulation optimization. Note that no simulation language or software will be taught in this course.

Prerequisites: Students are required to have a strong background in calculus-based probability and statistics and some computer programming experience in Fortran, C, C++, Basic, or Matlab, in which part of the homework assignments will be carried out.

Required Work: Homework will be assigned on a weekly or bi-weekly basis, and will be due at the beginning of class on the due date. There will be one in-class exam (time and location to be announced in class two weeks prior to the exam date). An integral part of this course is a final project that either addresses the simulation and analysis of a particular problem of interest or investigates an advanced simulation methodology (more details will be given later, including possible topics).

Grading Policy: Your final grade will be calculated based on 20% homework, 40% in-class exam, and 40% final project.

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.