STAT9820: Stochastic Processes  
Spring Semester, 2017  
Time: 11:00-11:50, MWF  
Location: MDLBH 10  

Instructor: Athanasios Christou Micheas, Ph.D.  
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Office Hours: 12:10-12:50, MWF (Also by appointment)  
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Course Web Site:  
• http://www.stat.missouri.edu/~amicheas/stat9820/index.html  

Text:  
• Probability and Measure, Third Edition, by Patrick Billingsley  

Recommended:  
• A modern Approach to Probability Theory, Bert Fristedt and Lawrence Gray, Birkhauser, 1997  
• Statistics for Spatial Data, 1993, Noel A.C. Cressie, Wiley.  
• Introduction to Stochastic Processes, 1975, Erhan Cinlar, Prentice-Hall.  

Prerequisites: STAT 9810 or instructor’s consent.  

Topics to be covered:  
• Rudimentary Review and Treatment of Markov chains and processes(elements of 4850): Introduction, visits to fixed states, classification of states, Limiting behavior and applications of Markov chains, state classification Recurrent, Periodic, Transient, Generators, Random Walks, Birth-Death Processes, many applications.  
• Review and Completements of Probability Theory, General Measure Theory and Integration, Expectation and Conditional Expectation given $\sigma$—fields, Martingales and some properties  
• Mathematical Treatment of Stochastic Processes  
  – Brownian Motion or Wiener Processes  
  – Spatial (Temporal) Processes: Spatial Point Patterns, Marked Point Processes  
• Modeling Objects: The Boolean Model, Random Set Growth Models (time permitted).
• Applications to MCMC: Gibbs Sampling, Metropolis-Hastings Algorithm (time permitted)
• Building on Martingales and Wiener Processes: Stochastic Calculus, Random Derivatives and Integrals, Itô Integral (time permitted)

Homework:
• There will be about seven problem sets assigned during the semester.
• When submitting your homework:
  – Display clearly on the top of the first page: your name(last, first), the course name and section and the assignment number.
  – Homework should be done on standard-size paper (8 1/2" by 11").

Exams:
• There will be one midterm examination and a comprehensive final exam. The dates for the exams are as follows (same room for all, MDLBH 10):
  – Midterm: Friday, March 17
  – FINAL EXAM: TBA
• Examinations must be taken at the scheduled times. Make-up exams will not be given.
• All exams are closed book. Calculators are allowed to help in numerical calculations.

Grading:
• Your grade will be based on a weighted average of your midterm score (30%), homework average (40%), and final exam score (30%).

Students with disabilities:
If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, see me privately after class or at my office.
If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the Office of Disability Services (http://disabilityservices.missouri.edu), S5 Memorial Union, 573- 882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Academic Honesty:
Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person’s work has been responsibly and honorably acquired, developed and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

Intellectual pluralism:
The University community welcomes intellectual diversity and respects student rights. Students who have questions concerning the quality of instruction in this class may address concerns to either the Departmental Chair or Divisional leader or Director of the Office of Students Rights and Responsibilities (http://osrr.missouri.edu/). All students will have the opportunity to submit an anonymous evaluation of the instructor at the end of the course. An email will be send to you about how to complete this process during the last few weeks of the semester.

- **Cell Phones:**

  It is your responsibility as a student of this university, to have your cell phones, ipods, kindles, etc., CLOSED before entering the classroom. If a cell phone rings, you text, or you use electronic devices during a lecture or exam, the instructor has the right to impose disciplinary sanctions, ranging from reduction of your final grade, probation to expulsion from the lectures. Only one warning will be given. Using cell phones in class is not proper university conduct. If you are expecting an important phone call for medical emergencies make sure you inform the instructor before the class/exam begins.