SYRACUSE UNIVERSITY, Spring 2019 SYLLABUS

MAT 526, Introduction to Stochastic Processes

General Information

Course Meetings: Tue/Thur 2:00PM - 3:20PM in Carnegie 219.
Instructor: Prof. JT Cox
Contact Information: Office: Carnegie 311B, Phone: 315-443-1488, email: jtcox@syr.edu.
Office Hours: TBA

Course Catalog Description:

Discrete time Markov chains, Poisson process, continuous time Markov chains and other selected stochastic processes. Prerequisite: MAT 521 or graduate standing in mathematical sciences

Texts:

- *Introduction to Stochastic Processes with R*, by Robert Dobrow, Wiley.
- A probability text at the level of MAT 521. For example, the free online textbook: *Introduction to Probability*, Grinstead & Snell. See: http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/amsbook.mac.pdf.
- A calculus book which covers infinite series and multiple integrals.

Course Overview:

This is a first course in the theory of stochastic processes. Topics to be covered include Markov chains, branching processes, the Poisson process, and continuous time Markov chains. A solid background in probability theory (MAT 521) is expected. In addition, being able to quickly recollect and apply techniques from calculus (through MAT 397), linear algebra, and ordinary differential equations is an expected skill for success in this course. After a brief probability review we will cover parts of Chapters 2-4 and 6-7, and a few additional selected topics.

Grading:

Your final grade will be based on two midterm exams (28% each), a cumulative final exam (28%), quiz/HW (16%). The course grading scale will be no stricter than the following scale: A (93-100); A- (90-92); B+ (87-89); B (83-86); B- (80-82); C+ (77-79); C (73-76); C- (70-72); D (60-70); F (0-59)

Exam Dates:

- Midterm Exam 1: Tuesday, February 19 (in class)
- Midterm Exam 2: Tuesday, April 9 (in class)
- CUMULATIVE FINAL EXAM: Friday, May 3 10:15AM- 12:15PM

Exams will be based on class notes and examples, text readings and examples, and homework assignments. In addition to problems, definitions and theorem statements, short proofs will be asked on exams.

Special Note on the Final Exam:

All students must take the cumulative final exam at the scheduled time on Friday, April 3, 2019, 10:15AM - 12:15PM. There will be no exceptions. You **should not plan to leave campus** until after the scheduled final is completed.

(No) Makeup Policy:

There will be absolutely no make-ups for any reason. If you miss a quiz/test for a valid reason (which must be verified by a note from a physician or your dean's office), performance from the corresponding part of a test/final will be used as replacement.

Homework:

Homework will be assigned regularly, some of which must be turned in. You are encouraged to discuss these problems with other students, but each of you is expected to write up your own solutions independently.

Quiz:

There may be occasional quizzes. These quizzes will be one or two problems very similar to the examples done in lecture and homework problems. The specifics will be announced in lecture ahead of time.

Attendance:

You are expected to attend every class and every exam. If you miss a class, it is your responsibility to obtain a copy of the lecture notes for that class from another student. You are also responsible for any announcements about changes to the course schedule, the exam schedule, or the course requirements that were made during that class.

Phone/Laptop/Tablet in class policy:

Phones, laptops, tablets, and similar electronics are not allowed during class. The one exception is that laptops may be used for taking notes.

Calculators:

You will need a calculator or a mathematical/statistical package to do some of the computations that will arise during the course. Instead of a calculator, it is recommended that you start using the statistical package **R** for these computations.

Statistical Software:

The textbook provides illustrations of making computations and simulations using the software **R**. It is a free (open source), highly functional software package, also available on campus. **R** can be used as a calculator.

Students with Disabilities:

If you believe that you need academic adjustments (accommodations) for a disability, please contact the Office of Disability Services (ODS), visit the ODS website http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting academic adjustments. ODS is responsible for coordinating disability-related academic adjustments and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since academic adjustments may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. Making arrangements with ODS takes time. Do not wait until just before the first test. Students taking exams at ODS should take them at times which overlap the exam time for the rest of the class.

Religious observances policy:

SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services > Enrollment > My Religious Observances) from the first day of class until the end of the second week of class.

Related link:
https://policies.syr.edu/policies/university-governance-ethics-integrity-and-legal-compliance/religious-observances-policy/.

Academic Integrity:

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

Specifically for this course, the academic integrity aspects relate to every quiz/midterm/final. No student is allowed to use ***any*** electronic device during any quiz/midterm/final. Moreover, such devices, ***including cell phones***, must be inaccessible during these periods, placed in closed backpacks or bags or brought up to the instructor's table. ***Any violation of this policy will be considered a violation of academic integrity***.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

Related link: http://class.syr.edu/academic-integrity/policy/

Learning Objectives:

After taking this course, students will be able to:

- understand the role of stochastic modeling
- gain practice developing and analyzing simple stochastic models
- learn and master some of the basic mathematical tools and techniques of stochastic modeling
- understand the relevant mathematical concepts and methods