MATH 632 section 003 Syllabus
Introduction to Stochastic Processes

COURSE INFORMATION

Introduction to Stochastic Processes
MATH 632 003 (3 Credits)
2020 Spring (1204) [1204]

Description
Topics include discrete-time Markov chains, Poisson point processes, continuous-time Markov chains, and renewal processes. Applications to queueing, branching, and other models in science, engineering and business. Enroll Info: None

Prerequisite(s)
(MATH/STAT 431, 309, STAT 311 or MATH 531) and (MATH 320, 340, 341, 375, 421 or 531) or graduate/professional standing or member of the Pre-Masters Mathematics (Visiting International) Program

Breadths
N - Natural Science

Instruction Mode
Classroom Instruction

Section Level Com B
False

Department: MATHEMATICS
College: Letters and Science

Canvas Course URL
https://canvas.wisc.edu/

2020 Spring (1204) [1204]
Term Start Date: Tuesday, 21-Jan-2020  Term End Date: Monday, 1-Jun-2020

Location and Schedule: Sewell Social Sciences 6102 TR 9:30 AM-10:45 AM
CRN: 600011701
How the Credit Hours are Met

This class meets for two 75-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

INSTRUCTORS AND TEACHING ASSISTANTS

Instructor

Timo SEPPALAINEN
SEPPALAI@MATH.WISC.EDU

Instructor Availability

Professor Seppalainen's office is Van Vleck 425. Office hours after class 11-12 TR or other times by appointment.

TA Office Hours

Grader: Yuan MA <ma227@wisc.edu>.

GRADING AND COURSE MATERIALS

Course Learning Outcomes (CLOs)

1. Recall and state the formal definitions of the mathematical objects and their properties for stochastic processes (e.g., discrete space Markov chains, Poisson processes, renewal processes, branching processes, etc.). [C1-1]

2. Use such definitions to argue that a mathematical object does or does not have the condition of being a particular type or having a particular property (e.g., irreducibility, aperiodicity, recurrence, transience, the Markov property, etc.). [C1-2]

3. Recall and state the standard theorems of stochastic processes. (e.g., laws of large numbers for Markov chains, existence of limiting/stationary distributions, law of large numbers for renewal processes, etc.) and recall the arguments for these theorems and the underlying logic of their proofs. [C1-3]
Grading

Course grades will be based on homework (with occasional quizzes possible) (20%), two midterm exams (20%+20%), and a comprehensive final exam (40%).

Here are grade lines that can be guaranteed in advance. A percentage score in the indicated range guarantees at least the letter grade next to it.

\[ [100,90] \text{ A, } (90,87) \text{ AB, } [87,76) \text{ B, } [76,74) \text{ BC, } [74,62) \text{ C, } [62,50) \text{ D, } [50,0) \text{ F.} \]

Final letter grades are not curved but the grade lines above may be adjusted at the end. Class attendance is not part of the grading.

Required Textbook, Software, & Other Course Materials

Lecture notes will be provided on Canvas. The following textbook is used on the side:


From Durrett we cover Chapters 1-5.
Midterm exams will be in class on the following dates: Exam 1 Thursday February 27 (Week 6) and Exam 2 Thursday April 9 (Week 11).

If you have to miss a midterm exam, I will increase the weight of the final exam to cover the missed midterm exam.

The final exam that covers the entire course is on Tuesday, May 5, 12:25-2:25 PM.

No calculators, cell phones, or other gadgets will be permitted in exams and quizzes, only pencil and paper. You can bring handwritten notes to each exam: one 2-sided 8x11 sheet to Exam 1, two sheets to Exam 2, and three sheets to the final exam.

Homework & Other Assignments

Homework will be assigned weekly or biweekly. Homework is collected in class on the due date, or alternately it can be brought to the instructor's office or mailbox by 2 PM on the due date. No late papers will be accepted. You can bring the homework earlier to the instructor's office or mailbox.

Observe rules of academic integrity. Handing in plagiarized work, whether copied from a fellow student or off the web, is not acceptable. Plagiarism cases will lead to sanctions. You are encouraged to discuss the problems with your fellow students, but in the end you must write up and hand in your own solutions.

Organize your work neatly. Staple the pages together. Use proper English. Write in complete English or mathematical sentences. Answers should be simplified as much as possible. If the answer is a simple fraction or expression, a decimal answer from a calculator is not necessary. For some exercises you may need a calculator to get the final answer.

As always in mathematics, numerical answers alone carry no credit. All the credit is in the reasoning you write down.

OTHER COURSE INFORMATION

Other Course Information

Honors optional. Honors credit requires at least a grade AB in the course and successful completion of three honors assignments. Honors assignments involve reading chapters from other books and solving problems from those books. Honors assignments will be described during the semester.

ACADEMIC POLICIES
**ACADEMIC INTEGRITY**

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison’s community of scholars in which everyone’s academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review.

**ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

McBurney Disability Resource Center syllabus statement: “The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.”

**DIVERSITY & INCLUSION**

Institutional statement on diversity: “Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.”

**RELIGIOUS OBSERVANCES**

UW faculty policy states that mandatory academic requirements should not be scheduled on days when religious observances may cause substantial numbers of students to be absent. Refer to the university’s Academic Calendar for specific information.