

Syllabus: MTH 465/565 Probability III

Course credits: 3.0

Meets: live via Zoom MWF 2:00 pm - 2:50 pm, or prerecorded.

Instructor: Yevgeniy Kovchegov

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Office Hours: MW 5-6 or by appointment, via Zoom

Grading scheme: Homework 80%, Online quizzes 20%

Prerequisites: MTH 464/564.

A minimum grade of C- is required in MTH 464/564.

Course Description: The third quarter of probability theory.

Course Content: Markov chains including random walks and birth-and-death chains, Chapman-Kolmogorov equations, stationary distribution, reversible Markov chains, ergodicity of Markov chains with applications in randomized algorithms, mixing times, continuous-time stochastic processes including queuing processes, generators, Kolmogorov forward and backward equations, hitting times, stopping times, martingales, the optional stopping theorem, probability harmonic functions, recurrence and transience of random walks, elements of Brownian motion.

Learning goals: (i) know how to find t-step transition probabilities of Markov chains via Chapman-Kolmogorov equations; (ii) know how to find stationary distributions of Markov chains and continuous-time stochastic processes (including reversible Markov chains); (iii) know how to find t-step transition probabilities of continuous-time stochastic processes (using generators and

Kolmogorov forward and backward equations); (iv) know how to find stationary distributions of queuing processes via reversibility; (v) know how to find expected hitting times; (vi) know how to use the optional stopping theorem for finding exit probabilities; (vii) know how to find and use probability harmonic functions.

Homework: The homework assignments will need to be submitted in PDF format via Canvas and before the respective deadline. Late homework will not be accepted.

Online Quizzes: There will be online quizzes, all on Canvas.

STUDENTS WITH DISABILITIES: Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

ACADEMIC HONESTY AND STUDENT CONDUCT: Students are expected to be familiar with Oregon State University's Code of Student Conduct. Please review this statement at <https://beav.es/codeofconduct>

REACH OUT FOR SUCCESS: University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at <http://oregonstate.edu/ReachOut>. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255)