

Western University
STATISTICAL SCIENCES 4654A 2018-2019
Markov Chains with Applications

Instructor Information

Instructor: Dr. Azaz Sharif

Email: asharif@stats.uwo.ca

Office hours: Tues at 3:00 pm to 4:00 pm and Fri at 10 am to 11 am at WSC#105, or by appointment
** Any changes to these hours will be announced in class and posted under Announcements on our OWL site.

Lecture Hours: Mon, Tue, Wed 4:30 pm to 5:30 pm/TC#204

Course Information

Course Description: Continuous-time Markov chains, applications to phase-type distributions, Markov chain Monte Carlo simulation and queuing theory.

Prerequisites: SS3657A/B A minimum mark of 60% in Statistical Sciences 3657A/B. A minimum mark of 60% in Statistical Sciences 3657A/B.

Antirequisites: The former Statistical Sciences 3652A/B, former Statistical Sciences 4652A/B, former Statistical Sciences 4657A/B and former Statistical Sciences 4737A/B.

Warning: Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. You can be deregistered at any time even after writing the final exam. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Course Website

Please check OWL (Online Western Learning) regularly for lecture notes, exam materials and announcements. A copy of this course outline is posted.

Course Textbook

Textbook: Introduction to Probability Models, 11th edition, by Sheldon M. Ross (Academic Press).

Course Objectives

Following a brief review of discrete time Markov chains, this course provides a thorough treatment of the theory and application of continuous time Markov chains, including phase-type distributions. Students will become familiar with Markov Chain Monte Carlo methods. A substantial part of the course pertains to the application of both discrete-time and continuous-time Markov chains to model queues. In addition to the theory of queues, students will gain insight regarding how congestion manifests itself in single-server and multi-server queues under first-come, first-served (FCFS) and priority arrangements. Networks of queues will be considered as well. The role of occupancy and variability on the degree of congestion will be analyzed, as well as the impacts of pooling of service resources and priority queueing arrangements. Motivating examples will be drawn from call centres and health care applications.

Department Policy on Missed Course Requirements

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.

E-mail Communication

You are welcome to communicate with your instructor by email, **but email communication should only be used to provide them with information or to ask a question that requires a brief response.** For more lengthy discussions and for discussions on lectures/course material please see your instructor during their scheduled office hours or by appointment. If you do email them, please use your UWO account, as these are often the only e-mails read.

Attendance

Classroom attendance is viewed as an important part of the learning process. Students are advised that excessive absenteeism may result in the student being disbarred from the final exam (see Western Academic Calendar).

Classroom Environment

The Department has adopted a “Mutual Expectations” policy governing the classroom environment and all work submitted by students. The full text of the policy can be found at: <https://www.uwo.ca/stats/undergraduate/mutual-expectations.html>. In summary, the policy was developed under the premise that all interactions between students and faculty should be governed by the principles of courtesy, respect and honesty.

