Spring 2026

WEEK 5 STUDY GUIDE

The Big Picture

You can think of a *stochastic process* as a random process indexed by time. A Markov chain is a stochastic process with a particular dependence structure that allows it to be used as a simple model in many settings.

- Under conditions that are pretty general, Markov chains run for a long time have powerful long-run properties.
- *Steady state* or *stationarity* has a physical interpretation and many uses.
- Many Markov chains, when run for a long time, exhibit different kinds of *balance*. These can be used to identify steady state properties.

Week At a Glance

Mon 2/16	Tue 2/17	Wed 2/18	Thu 2/19	Fri 2/20
Holiday: No Office Hours	Lecture	Sections (turned into OH 9AM - 4PM)	Lecture	Mega Sections
	Lab 3B Due at NOON		No lab party because there is no lab this week	
	HW 4 Due at NOON HW 5 (Due Mon 2/23)			HW 5 Party 2-5 PM in Evans 330
	Study for exam	**Midterm 1**	Work through Chapter 10	Work through Section 11.1.

Reading, Practice, and Live Sessions

Book	Topic	Lectures: Prof. A	Sections: TAs	Optional Additional Practice
Ch 10	**Markov chains** - 10.1 introduces terminology, notation, and basics, along with a computational approach to the long run - 10.2 narrows down the type of chain we'll be studying, but even the narrowed-down group is large and interesting - 10.3 takes a more theoretical approach to the long run	Tuesday 2/17 - Introduction to Markov chains - Long run behavior	Wednesday 2/18 - Sections are converted into Office Hours for exam prep.	None. There are no exercises in Ch 10. All the Markov Chains exercises are in Ch 11, at which point you'll have techniques that make some of the solutions easier.
Ch 11	**Balance and detailed balance** - 10.3 takes a more theoretical approach to the long run - 11.1 is about different kinds of balance, and how one of them can make it easy to identify the other	Thursday 2/19 - Different kinds of balance - Spotting the one that makes calculations easy	Friday 2/20 - Ch 11 Ex 1, 3, 4, 5	Chapter 11 Ex 2 The Konstantopoulos exercises listed after Ex 5 come with complete solutions.