ISE 331: Introduction to Operations Research: Stochastic Models University of Southern California, Spring 2023

Prof. John Gunnar Carlsson, jcarlsso@usc.edu

1 Overview

This course is a basic introduction to important models and solution methods in Industrial and Systems Engineering (ISE) that involve *randomness*. ISE is concerned with the modelling, analysis, and solution of complex decision problems that arise in the management or design of a large-scale industrial system such as a supply chain, transportation network, or manufacturing assembly line. This course will review basic probability and cover its applications in ISE, such as Markov chain modelling and queueing theory.

2 Required Text

The required text for this course is:

- Ross, Sheldon. Introduction to Probability Models. 11th edition. Academic Press, 2018.

3 Course Requirements

Grading will be based on problem sets, two take-home midterm exams, and a final exam. We will have between 7 to 10 problem sets and the lowest score will be dropped. Students may collaborate in groups of two or three on problem sets, but each student must write up their own assignments. In addition, students must write the names of all collaborators at the heading of each assignment. Course grades will be broken down as follows:

Requirement	% of Grade
1. Midterm exam 1	20%
2. Midterm exam 2	20%
3. Final exam	20%
4. Problem sets	40%

4   Class schedule

The approximate breakdown for course material follows below:

1. Probability review
2. Conditional probability
3. Discrete time Markov chains
4. Exponential distribution
5. Poisson processes
6. Continuous time Markov chains
7. Queueing theory