Instructor: J.L. Higle   **Instructional Assistant**: Michael Hintlian
Office: Zoom (see Blackboard for details)   **Office Hours**: Thurs 2:00-3:00 pm, Fri noon-2:00 pm.
Office Hours: Tues/Thurs, 11:00-12:30 pm   **Email**: hintlian@usc.edu
Email: higle@usc.edu

Schedule: Mon/Wed 2:00-3:20pm – Zoom (see Blackboard for details)

Prerequisite: ISE 220 Probability Concepts in Engineering (or equivalent)
   By topic: calculus based probability (i.e., axioms of probability, discrete and continuous distributions, expectation).

Goals: The objective of this course is to familiarize students with some of the probabilistic models available for the analysis and solution of common ISE problems in which uncertainty and randomness are particularly important. Upon completion of ISE 331, the student should
   1) Be able to develop an appropriate probabilistic model from a verbal description of a problem
   2) Have an understanding of the restrictions associated with various modeling assumptions
   3) Be able to extract relevant information from various types of models

Outcomes: Students will develop an understanding of modeling with exponential and Poisson random variables, methods for formulating and analyzing Markov Chains (both discrete-time and continuous-time), and analytical models used to study the queueing behavior of systems.

Textbook: *Introduction to Probability Models*, 12th Edition. (S.M. Ross, Academic Press, 2019).

Grading Policy: There will be no graded homework assignments, no exams, and no quizzes. There will be 4 projects assigned throughout the semester, which constitute 80% of your final score. There are 20 PlusPoints that account for the remainder of your score. PlusPoint opportunities will be made available somewhat randomly throughout the semester. To the extent possible, "natural gaps" in the class distribution of total points will be used to assign grades.

Assignment(s)	Points
Projects: A total of 4 projects, worth 20 points each.	80
+Points	20
Total	*100*

Notes:
   ♦ Assignments must be submitted through Blackboard (i.e., not to the instructor or TA).
   ♦ Assignments are due on the date and time specified in the assignment statement.
       – Projects submitted up to 1 day late will be accepted, but there will be a 4pt deduction.
       – Projects submitted more than 1 day late will not be accepted for credit.
       – +Point solutions that are submitted late will not be accepted for credit.
   ♦ If you rely on or use one or more sources of information or assistance, including classmates or other students, you must properly acknowledge the source. Failure to do so is a violation of the University Student Conduct Code and will be dealt with accordingly.

All times are "California Time" (CA time). This is PST or PDT, depending on the date.

- ♦ A review of potential errors in the grading of a project can be requested, per the following steps:
  - – The request must be submitted between 12:01am and 11:59pm on the day of the first class after the graded projects are returned to the class. Requests will not be accepted outside of this window.
  - – The request must include a note identifying the perceived grading error(s). The note should clearly indicate the nature of the error(s) from the student's perspective and must be "signed" by all members of the project group.
  - – The error(s) identified in the note will be reviewed, and the exam will be returned as soon as possible.

Final Exam: The time schedule indicates that the final exam will be held on **Monday, May 10, 2-4pm**. Although we will not have a final exam in this class, it may become necessary to use this time for presentation of final projects.

Academic Integrity
The Epstein Department of Industrial and Systems Engineering adheres to the University's policies and procedures governing academic integrity as described in SCampus. Students are expected to be aware of, and to observe, the academic integrity standards described in SCampus. Students should expect that those standards will be enforced in this course.

Accommodations for Disabilities
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure that the letter is delivered to the instructor as early in the semester as possible. DSP is located at STU 301 and is open from 8:30 am – 5:00 pm Monday – Friday. The phone number for DSP is 213.740.0076.

Date		Topic	Notes		Activity	Notes*
January	~~18~~	NO CLASS (MLK)		20	Review **Breakout Session (Report Back)	Ch. 1,2
	25	Review	Ch. 2	27	Problem Session	
February	1	Prob. & Expectations by Conditioning; **Assign Project 1	Ch. 3	3	Problem Session	
	8	Conditioning (cont.)		10	Problem Session **Discuss Project 1	
	15	NO CLASS (President's Day)	Ch. 4	17	Discrete Time Markov Chains (Lec) **Project 1 Due **Assign Project 2	
	22	DTMC		24	Lecture and/or Problem Session	
March	1	DTMC		3	Problem Session **Discuss Project 2	
	8	Exponential Distributions **Project 2 Due	Ch. 5	10	Lecture and/or Problem Session	3/12 "W"
	~~15~~	Poisson Process		17	Project 2 Presentations? Problem Session? **Assign Project 3	
	22	Poisson Process	Ch. 5	24	Lecture and/or Problem Session	3/23 "W"
	29	Poisson Process; Continuous Time Markov Chains		31	Problem Session **Discuss Project 3	
April	5	CTMC **Project 3 Due	Ch. 6	~~7~~	NO CLASS (Wellness)	
	12	CTMC		14	Project 3 Presentation? Problem Session? **Assign Project 4	
	19	Queueing Theory (QT)	Ch. 8	21	Lecture and/or Problem Session	4/22 "W"
	26	QT … **Discuss Project 4?		28	**Project 4 Due??	4/30 "W"
May	3	Study Period Begins		5	Final Exams Begin	
	10	Final Exam Period **Project 4 Due??				

* "W" indicates a Wellness Day

** Project Presentations are not required, but may result in a +Point;
   Presenters are selected via "volunteering" and "invitation by the instructor."