SIE 321 Probabilistic Models in Operations Research

Monday, Wednesday, and Friday, 1:00-1:50pm (AME S212)

Instructor: Dr. Ruiwei Jiang
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Office hours: MW 4:30-5:30pm (Instructor, ENGR 310) TTh 11:00am-noon (TA, ENGR 123)

Note: you may also email the instructor to ask questions or make appointments if you would like to meet another time.

Course website
We will be using D2L. All class materials, including homework, handouts, etc., will be distributed via D2L. We will also send emails to the whole class throughout the semester using the classlist in D2L. Students are expected to forward their D2L emails to an email address they frequently use. Otherwise, students might miss some important information.

Textbooks
No textbooks are required for this course, but you can read the following books as reference.


Course objectives
- To develop a basic familiarity with stochastic process models.
- To improve the ability to analyze stochastic systems.
- To apply probabilistic models in engineering, finance, public policy, etc.

Pre-requisites
SIE 305 (Introduction to Engineering Probability and Statistics) is a formal pre-requisite for this course. Furthermore, a working knowledge of calculus and probability can help students be successful in this course.

Course outline
Probability (distribution functions, random variables, independence, expectation, conditioning), discrete-time Markov chains (modeling, transition probabilities, steady-state probabilities), continuous-time Markov chains (modeling, exponential and Poisson random variables, steady-state probabilities, birth-and-death process), and Queueing theory (Little’s law, PASTA property, M/M/1 queue).

Homework and exams
There will be around six homework assignments in total. Discussion is allowed and individual submission is required. To be fair to everyone, students are required to submit their

1This syllabus is tentative and the instructor reserves the right to make modifications if appropriate.
homework on time, and not to ask TA homework questions before they submit the homework.

There will be two midterms and one final:

- The first midterm will take place in class on Friday Mar. 6th.
- The second midterm will take place in class on Monday Apr. 13th.
- The final will take place in class 1:00-3:00pm on Tuesday May 12th, and will not be cumulative.

In all exams, students can bring a double sided letter-size paper, while other materials (reference books or notes) will not be allowed.

Requests for a re-grade of exam/homework will be considered only within one week from the time the graded exam/homework is returned.

To be fair to everyone in the class, no extra projects/homework/exams will be available to help students boost their grades. Please do not ask.

**Grading**

Percentages: Homework 20%, Midterms (higher score of the two midterms) 40%, Final 40%.

Scales: 90-100 A, 80-89 B, 70-79 C, 60-69 D, 0-59 E. The scales may be curved or modified as appropriate.

Incomplete will not be given unless a serious medical illness/injury prevented a student from attending the class for a large portion of the semester (claims for such incomplete should be submitted with supporting documentation). Note that for an incomplete to be given, the student should have been in good standing prior to the illness/injury. Please do not ask if you do not qualify for an Incomplete.

**Make-Up Exam Policy**

With few exceptions, make-up exams will not be offered. A missed exam results in a 0 for the exam grade. On a case-by-case basis, the instructor will consider exceptions to this rule. They should not involve, e.g., trips home for Easter or personal leave. For pre-planned absences, students should seek permission at least one month in advance, or as soon as possible should the necessity arise within one month of an exam.

**Attendance and Expectations**

Students enrolled in this class are recommended attending the regular class meetings and the instructor reserves the right of giving random quizzes whenever the attendance is less than 70% of the class. Students absent from classes will be responsible for getting all written materials, announcements, and notes from students that did attend class.

**Honesty Policy**

All students are expected to commit themselves to be honest in all academic work and understand that failure to comply with this commitment will result in disciplinary action. This is a reminder to uphold your obligation as a UA student and to be honest in all work submitted and exams taken in this course and all others.

**Accommodation for Students with Special Needs**

Students with disabilities or special needs for accommodations (including in class meetings and exams) are required to contact both the instructor and the S.A.L.T. Center (www.salt.arizona.edu) or the Disability Resource Center (drc.arizona.edu) as early as possible in the semester. They
are also required to submit appropriate documentations to the instructor before accommoda-
tions could be offered.