SIE 321 Probabilistic Models in Operations Research

Spring 2026

Class meeting times & location:
MWF 1:00pm – 1:50pm, AME S212

Instructor: Prof. Pavlo A. Krokhmal
Office: ENGR 223
Tel: (520) 621-2605
E-mail: krokhmal@arizona.edu
Office hours: MW 12:00pm – 12:50pm, or by appointment

TA: Mohammad Ahmadi (ahmadi@arizona.edu)
Office hours: Tuesdays 2:00pm – 3:00pm (via Zoom, https://arizona.zoom.us/j/83722635071)
               Thursdays 11:00am – 12:00pm (in person, in ENGR 323)

Course Description: The course covers fundamental probabilistic models and applications of operations research, which describe industrial systems and processes involving uncertain or random information or data.

Textbook: No textbook is required for this course; the following texts can be used as reference:
- Winston, W. *Operations Research* (4th edition), Thompson, 2003 (Reference)
- Hillier, F. Lieberman, G. Introduction to Operations Research (10th edition), McGraw-Hill, 2013
- Ross, S. *Introduction to Probability Models*, (10th edition), Academic Press, 2009 (Reference)

Prerequisites: SIE 305 *Introduction to Engineering Probability and Statistics;* a working knowledge of calculus and linear algebra.

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

Course topics:
- Review of probability
- Probabilistic decision analysis (decision criteria, utility theory, decision trees)
- Stochastic processes and Markov chains (modeling, transition probabilities, long-term properties)
- Queueing theory (birth-and-death processes, Little's law, M/M/s/K/N queueing models, queueing models with non-exponential distributions)
- Deterministic and stochastic inventory models (EOQ models, elements of supply chains, stochastic inventory models for perishable products)

Computer Support: PC with internet access. All class materials, including lecture notes, assignments, etc., will be distributed via course's D2L website (https://d2l.arizona.edu). Class announcements will also be posted on D2L and/or distributed via D2L email classlist.

Assignments: Homework (25%), Quizzes (15%), two Midterm Exams (20% each), Final Exam (20%).

Homework will be given weekly. Discussion is allowed but individual submission is required. Homework assignments will be posted on the course's D2L website (https://d2l.arizona.edu), usually about one week

before the due date. **Homework assignments must be uploaded to the D2L submission folder by 5:00PM on the day they are due.** Assignments will be graded in about one week.

Quizzes will be given in class with a prior announcement and will cover the most recent material. Quiz policy is closed-book, open-notes. **No make up quizzes will be given.** If you were unable to take a quiz for a valid reason, the corresponding grade will be omitted from the final grade calculation. If you expect to miss a quiz for a valid reason, inform the instructor and TA by email and provide supporting documentation. **The lowest quiz grade will be dropped.**

The midterm and final exams will test your overall understanding of the concepts and material covered in lectures and in homework. The exams' policy is closed-book and closed-notes, but you are allowed to bring one letter-sized "cheat sheet". Only engineering calculators are allowed on exams and quizzes; no laptops, smartphones, or tablets.

Tentative exam dates:
- Midterm exam 1: Monday, February 16 (in class)
- Midterm exam 2: Monday, March 30 (in class)
- Final exam: Monday, May 11 (1:00 – 3:00pm)

Grading:
A: 90.00 – 100.00
B: 80.00 – 89.99
C: 70.00 – 79.99
D: 60.00 – 69.99
F: 0 – 59.99

Late Assignments: No credit will be given to assignments submitted late.

Attendance Policy: Students are expected to attend class. If you miss class, you are responsible for obtaining the class notes, assignments, and announcements. Phone usage is not allowed during the class; please put your phone into "quiet", or "vibrate" mode prior to start of the class.

Accessibility and Accommodations: At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, https://drc.arizona.edu) to establish reasonable accommodations.

Academic honesty: 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.

Generative AI use is NOT allowed: In this course any and all uses of generative artificial intelligence (AI)/large language model (LLM) tools and platforms, such as ChatGPT, Dall-e, Claude, Gemini, Grok, DeepSeek, Copilot, etc., will be considered a violation of the Code of Academic Integrity, specifically the prohibition against submitting work that is not your own. This applies to all assessments in the course. Examples of prohibited generative AI uses include, but are not limited to:
- Entering all or any part of an assignment statement or question as part of a prompt into an AI/LLM tool
- Incorporating any part of an AI-written response in an assignment
- Using AI to summarize or contextualize reading assignments or source materials
- Submitting your own work for this class to a large language model AI tool for iteration or improvement

This syllabus is tentative and the instructor reserves the right to make modifications if appropriate.