

**SIE 321: Probabilistic Models in Operations Research
Spring 2022**

Instructor Contact Information

Dr. Erfan Yazdandoost Hamedani (erfany@email.arizona.edu)

Office Hours (via Zoom or in-person): Wednesday and Friday 3:30pm-4:30pm (or by appointment)

Office: ENGR 321 Meeting ID: 83816002031

TA: Samuel Erickson (samuelerickson@email.arizona.edu)

Office Hours: Tuesday and Thursday 1:00pm-2:00pm by Zoom only

Meeting ID: 82921658966

Grader: Kelsey Ramirez (kelseyramirez@email.arizona.edu)

Time and Location: Mon, Wed, Fri 1:00PM-1:50PM

Location: Aero & Mech Engr, Room S212

Face Coverings: Masks are required for everyone, regardless of vaccination status, in all indoor spaces where continuous physical distancing is not possible (including, but not limited to, classrooms, teaching laboratories and other shared spaces). Requirements related to COVID-19 may change during the semester. Please check COVID-19 website (<https://covid19.arizona.edu>) regularly to access the most up-to-date information.

Course Format and Course Website: This course will be delivered in-person. You need to check <https://d2l.arizona.edu> at least once per day for lecture notes, homework assignments, project instructions, supplemental readings, grades, etc.

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.

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

Learning Outcomes:

- Developing a basic familiarity with stochastic process models
- Developing the ability to analyze stochastic systems
- Applying probabilistic models in engineering, finance, public policy, etc.

Textbooks: No textbook is required for this course; comprehensive lecture notes will be posted on D2L. The following texts can be used for additional reference:

- Winston, W. Operations Research (4th edition), Thompson, 2003
- Hillier, F. Lieberman, G. Introduction to Operations Research (10th edition), McGraw-Hill, 2013
- Ross, S. Introduction to Probability Models, (10th edition), Academic Press, 2009

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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)

Class Recordings: The class will be recorded using Panopto and it will be uploaded on D2L website. If you have any questions or concerns about the recording, please contact the instructor. For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension or civil action.

Grading Scale and Policies: 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 Assignments folder by **11:59pm** on the due date. The assignments must be uploaded as single-file, multi-page, clearly legible PDF documents. It is recommended that you use a smartphone document scan app, such as Adobe Scan or Microsoft Lens; there are great selections of these for Android and iOS, chose the one you feel most comfortable with.
- **Quizzes** will be given in class with prior announcements and will cover the most recent material. Quizzes' policy is closed-book, open-notes. No makeup 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 TAs 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 use one letter-sized "cheat sheet". Only engineering calculators are allowed on exams and quizzes; no use of laptops, smartphones, or tablets is permitted during exams. Exams are **not cumulative**.

Attendance Policy: Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is mandatory at all lectures and discussion section meetings. If you miss a class, you are responsible for informing the instructor beforehand and obtaining the class notes, assignments, and announcements.

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Late Assignments: Homework assignments uploaded late on D2L will have points deducted. 50% of the grade will be reduced for up to 24-hour late submission. No grade will be given for more than 24 hours late submission.

Regrading: If you feel that an error has been made in grading your assignment, you may request a regrade in a written form outlining the potential error and submitted to the instructor via email within one week of it being returned (please attach the scanned copy of homework/exam). This timetable will be strictly adhered to. The TA is not going to accept the regrading request.

Final grade: The final letter grade will be distributed as follows: A: 90-100; B: 80-89.9; C: 70-79.9; D: 60-69.9; E: ≤ 59.9 . Requests for incompletes (I) and withdrawal (W) must be made in accordance with university policies which are available at <http://catalog.arizona.edu/policy-type/grade-policies>.

Tentative exam dates:

- Midterm exam 1: Monday, Feb 14 (in class)
- Midterm exam 2: Monday, Mar 28 (in class)
- Final exam: Monday, May 9 (1:00pm – 3:00pm)

Long-distance students enrolled in Section 10 are expected to make accommodations and take exams during the regular exam time.

Academic advising:

If you have questions about your academic progress this semester, please reach out to your academic advisor (<https://advising.arizona.edu/advisors/major>). Contact the Advising Resource Center (<https://advising.arizona.edu/>) for all general advising questions and referral assistance. Call 520-626-8667 or email to advising@.arizona.edu

Life challenges: If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at 520-621-2057 or DOS-deanofstudents@email.arizona.edu.

Physical and mental-health challenges: If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520-621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Absence and Class Participation Policy: Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Absences may affect a student's final course grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class online activities, please contact me as soon as possible. To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or drc-info@email.arizona.edu. If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.



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The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>. The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>. Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Classroom Behavior Policy: To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (i.e. texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy: The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See: <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Accessibility and Accommodations: Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcomed to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit <http://drc.arizona.edu/>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Code of Academic Integrity: Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism available at:

<http://new.library.arizona.edu/research/citing/plagiarism>

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

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UA Nondiscrimination and Anti-harassment Policy: The University is committed to creating and maintaining an environment free of discrimination, <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Name and pronoun usage statement. This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.

Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course.

Additional Resources for Students: UA Academic policies and procedures:
<http://catalog.arizona.edu/2015-16/policies/aaindex.html> Student Assistance and Advocacy information:
<http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>
Office of Diversity: : <http://diversity.arizona.edu>
Campus Health: <http://www.health.arizona.edu/counseling-and-psych-services>

Subject to Change Statement: This syllabus is tentative, and the instructor reserves the right to make modifications if appropriate.