



## SIE 340: Deterministic Operations Research Fall 2022

### Instructor Contact Information

Dr. Afrooz Jalilzadeh ([afrooz@arizona.edu](mailto:afrooz@arizona.edu))

Office Hours (via Zoom or in-person): Monday, Wednesday 3:00pm-4:00pm (or by appointment)

Office: ENGR 318B Meeting ID: TBA

### Teaching Assistants Contact Information

TBA

Office Hours: Tuesday, Thursday 11am-12pm (Zoom only) Meeting ID: TBA

TBA

Office Hours: Tuesday, 3pm-4pm (Zoom only) Meeting ID: TBA

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### Time and Location



Mon, Wed, Fri 2:00PM-2:50PM

Location: Aero & Mech Engr, Room S212

### Class Recordings

The class will be recorded using Panopto and 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.

### 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

Student will learn to formulate linear programs and learn solution strategies such as the simplex method. Duality and sensitivity analysis also will be covered.

### Course Prerequisites

SIE 265 - Engineering Management, and SIE 270 - Mathematical Foundations of Systems and Industrial Engineering, or equivalent knowledge of linear algebra (systems of linear equations, matrix methods for systems of linear equations).



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### Learning Outcomes

- Apply analytical skills to develop an appropriate linear programming model
- Demonstrate an ability to choose an appropriate solution technique
- Extract relevant information from the model and solution

### Required Textbook (One of the following):

- Wayne L. Winston, Operations Research: Applications and Algorithms, ISBN-10: 0534380581, Cengage Learning; 4 edition, 2003.
  - Winston, W. L. and Venkataramanan, M., Introduction to Mathematical Programming, ISBN: 0-534-35964-7, Edition: 4, Publisher: ITP EDUC/THOMSON LEARNING.
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### Grading Scale and Policies

**Homework (15%):** 6 sets, the lowest homework grade will be dropped.

- The main purpose of the homework assignments is to help you practice the skills needed to meet the learning outcomes for this course.
- Homework assignments and due time will be posted in the Assignments section on D2L.
- 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.

**Quizzes and Attendance (5%):** 6 quizzes, the lowest quiz grade will be dropped.

- Two main purposes of the quizzes are (i) to help students to have a better idea of how well they are grasping the material (ii) encourage attendance.
- Random choice of time. Quizzes will be held during the class time.

**Midterm exam 1 (20%):** Monday, October 3, 2:00 PM – 2:50 PM in our regular classroom.

**Midterm exam 2 (20%):** Monday, November 7, 2:00 PM – 2:50 PM in our regular classroom.

- The exams will be based on the material covered during lectures, homework assignments, and the materials on D2L Content.

**Final exam (25%):** Final exam is on Friday, December 9, 1:00 PM - 3:00 PM in our regular classroom and its format is similar to the midterm exams.

**Class project:** 15% (Team of 1-3 students, students need to use Excel, more details will be given in class).

- **Objective:** Develop an appropriate linear programming model for a real-world problem and apply optimization techniques to solve the problem using Excel and analyzed the solution.



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**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 TAs are not going to accept the regrade 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:  $\leq 59.9$ . 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>.

**Honor Credits:** Students registered this course for honors credits should email the instructor to set up an appointment to discuss the additional requirements.

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### Guide to Success:

1. Spend 5 minutes before each class to preview what we are about to learn.
  2. Come to class and take notes by hand.
  3. Use the textbook to read more examples and details about each topic.
  4. Do homework without using solved examples as a guide.
  5. Teach material to a real or imagined audience. In trying to explain concepts in a way that others can understand, you become aware of the details that are not entirely clear.
  6. Go to office hours. Office hours are for any students who want to talk to the professor about Homework, Classwork, Learning Strategies, Research Opportunities and Career Goals.
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### Scheduled Topics

1. Introduction to Mathematical Modeling and Review of Linear Algebra
  3. Solving Linear Programming (LP) Problems (Graphical solutions and Simplex Algorithm)
  4. Sensitivity Analysis and Duality
  5. (if time permits) Transportation, Assignment, Network Flow Problems, and Integer Programming
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### Classroom Attendance

- If you must miss the equivalent of more than one week of class, you should contact the Dean of Students Office [DOS-deanofstudents@email.arizona.edu](mailto:DOS-deanofstudents@email.arizona.edu) to share documentation about the challenges you are facing.



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- Non-attendance for any reason does **not** guarantee an automatic extension of due date or rescheduling of examinations/assessments.
  - Please communicate and coordinate any request directly with your instructor.
- Visit the [UArizona COVID-19](#) page for regular updates about COVID-19.

### 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](mailto: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](mailto: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.

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### 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](mailto: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.

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>



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### 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>.

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### 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.

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### 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



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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.

### **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.

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### **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**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.