SIE 340: Deterministic Operations Research
Fall 2018

Time and Location

MoWeFr 2:00PM-2:50PM, Aero & Mech Engr, Rm S212

Description of Course

(3 units) Linear programming models, solution techniques, sensitivity analysis and duality. The objective of SIE 340 is the development of a working knowledge of deterministic operations research techniques, primarily linear programming.

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).

Instructor and Contact Information

Dr. Neng Fan
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Office Hours: WeFr 1:00PM-2:00PM (or appointment by email)
Email: nfan@email.arizona.edu
Phone: 520 621 6557

Teaching Assistants:

Wanlu Gu
Office: ~~ENGR 323~~ ENGR 258
Office Hours: MoWe 3:00PM-4:00PM (or appointment by email)
Email: wanlugu@email.arizona.edu

Hamid Ghaderi
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Office Hours: WeFr 3:00PM-4:00PM (or appointment by email)
Email: ghaderi@email.arizona.edu

Course website: https://d2l.arizona.edu All class materials, including lecture notes, homework assignments, project instructions, supplemental readings, grades, etc., will be distributed through D2L. You must check the announcements in D2L at least once per day.

Course Format and Teaching Methods

Lectures, group projects, in-class discussions

Course Objectives and Expected Learning Outcomes

The objective of SIE 340 is the development of a working knowledge of deterministic operations research techniques, primarily linear programming. Students are expected to

- Develop an appropriate linear programming model from a verbal description of a problem,
- Choose an appropriate solution technique and
- Extract relevant information from the model and solution.

Absence and Class Participation Policy

Participating in 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. Students who miss class due to illness or emergency are required to bring documentation from their healthcare provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

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.

Required Texts or Readings

Textbook:

Wayne L. Winston, Operations Research: Applications and Algorithms, ISBN-10: 0534380581, Cengage Learning; 4 edition, 2003. *or*

Winston,W. L. and Venkataramanan, M., Introduction to Mathematical Programming, ISBN: 0-534-35964-7, Edition: 4, Publisher: ITP EDUC/THOMSON LEARNING.

References:

Bradley, S.P., A.C. Hax, and T.L. Magnanti, Applied Mathematical Programming.
Hillier, F.S. and G.J. Lieberman, Introduction to Operations Research.
Taha, H. Operations Research.

Assignments, Examinations and Grade Policies

Homework: 8 sets, 20% (Late homework will not be accepted.)
Quiz: 5 times, 10% (Random choice of time.)
Exam: Midterm exam 1 (15%), Midterm exam 2 (15%), Final exam (25%)
Class project: 15% (Team (1-3 students) can be formed for the final project. Each team submits a one-page progress report and one final project with at least 10 pages. The objective of the final project is to apply optimization techniques and software to study a research topic selected by the team. More details will be given in class.)

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.

For questions on grades, you have to talk to teaching assistant or the instructor within one week of grades posted. Students registered this course for honors credits should email me to set up an appointment to discuss the additional requirements.

Scheduled Topics

Introduction to Mathematical Modeling
Review of Linear Algebra
Solving Linear Programming Problems
- Graphical solutions of LP problems
- Simplex algorithm

Sensitivity Analysis and Duality
Transportation, Assignment, and Network Flow Problems
Introduction to Integer/Nonlinear Programming

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 welcome 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.

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 are available at:
http://catalog.arizona.edu/2015-16/policies/aaindex.html
Student Assistance and Advocacy information is available at:
http://deanofstudents.arizona.edu/student-assistance/students/student-assistance
Office of Diversity (http://diversity.arizona.edu)
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.