SIE 649 TOPICS OF OPTIMIZATION: STOCHASTIC OPTIMIZATION

Fall 2018

Class meeting times & location:
T Th 3:30pm – 4:45pm, ENGR 301

Instructor: Prof. Pavlo Krokhmal
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Office hours: MWF 2:00pm – 3:00pm, or by appointment

Course Description: Stochastic Optimization is an introductory course for graduate students in engineering, operations research, management, etc. The objective of the course is to familiarize students with the challenges that uncertain or randomized data bring into decision making/design process and introduce the general methods and approaches for dealing with such challenges. We will discuss various approaches to modeling of uncertainties and risk in optimization problems, properties of the resulting stochastic programming formulations, and several common techniques for solving stochastic programs.

Course Topics:

- Applications and examples
- Modeling of uncertainties in optimization problems (decisions and stages, two-stage and multi-stage programs, probabilistic programming, risk-averse optimization, etc.)
- Basic theory and properties of two-stage and multi-stage stochastic problems
- Solution methods (L-shaped method, stochastic quasi-gradient methods, etc.)
- Modeling with AMPL

Required text: None

Recommended texts:

John R. Birge, François Louveaux, *Introduction to Stochastic Programming*, 2nd Edition, ISBN-10: 1461402360

Prekopa, A. *Stochastic Programming*, ISBN: 978-94-017-3087-7

Shapiro, A., Dentcheva, D., and A. Ruszczynski. *Lectures on Stochastic Programming: Modeling and Theory*, ISBN: 978-0-898716-87-0

Kall, P. and S. Wallace (1994) *Stochastic Programming*, 2nd Edition. Wiley & Sons, Chichester (the publisher reverted the rights to the authors on February 4, 2003; also available for download from the course website at http://icon.uiowa.edu)

Prerequisites: Courses in probability and linear programming/operations research

Computer Support: PC with internet access

Assignments: 50% Homework, 50% Project

Grading:
A: 90 – 100%
B: 80 – 89%
C: 70 – 79%
D: 60 – 69%
E: 0 – 59%

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.

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 (http://drc.arizona.edu) as early as possible in the semester. They are also required to submit appropriate documentations to the instructor before accommodations could be offered.

Statement of Inclusion: 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.

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.

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.

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