

OR 750: STOCHASTIC OPTIMIZATION

Syllabus

Instructor:	Hadi El-Amine	Time:	Tue 4:30 - 7:10pm
Email:	helamine@gmu.edu	Place:	Innovation 139
Office:	Engineering Building 2240	Office hours:	Tue 1 - 3pm

Course description: This course provides an introduction to stochastic optimization, more specifically, stochastic programming. The objectives are (i) to provide students with the ability to model and solve optimization problems under uncertainty, and (ii) to make students familiar with the state-of-the-art of stochastic programming. The course will be offered in a lecture format, and homeworks will be used to reinforce and supplement information in each section. Throughout the semester we will be reading research papers to supplement the material in the text book. Papers and other course material will be provided on Blackboard. Students should be proficient with one programming language (e.g., MATLAB, Python, Java, C++) and should be able to become familiar with a math programming solver (e.g., Cplex, Gurobi.)

Main references:

- John Birge and François Louveaux, *Introduction to Stochastic Programming*, Springer, New York, 2011. Available online through the university library website.
- Alexander Shapiro, Darinka Dentcheva, and Andrzej Ruszczyński, *Lectures on Stochastic Programming. Modeling and Theory*, MPS/SIAM Series on Optimization, SIAM, Philadelphia, PA, 2009. Available online at http://www2.isye.gatech.edu/people/faculty/Alex_Shapiro/SPbook.pdf.

Prerequisites: OR 541 and OR 542.

Tentative course topics:

- Introduction and modeling
- LP and probability review, modeling and stochastic optimization examples
- Two-stage stochastic optimization problems
- Chance-constrained problems
- L-shaped method
- Decomposition methods
- Robust linear and quadratic optimization
- Distributionally robust optimization

Grading policy:

- 40% Homework assignments (4–5 of them)
- 40% Research project
- 20% In-class participation and presentations

Academic honesty: All students must adhere to the Honor Code policies of George Mason University. The Honor Code will be strictly enforced in this course. All work for the course shall be considered graded individual work, unless otherwise noted. All aspects of your coursework are covered by the honor system. Any suspected violations of the Honor Code will be reported to the honor court.

Honesty in your academic work will develop into professional integrity. The faculty and students of George Mason University will not tolerate any form of academic dishonesty. The Honor Code is posted on the George Mason University's web page <http://oai.gmu.edu/the-mason-honor-code-2/>.