OR 750: Stochastic Optimization
Fall 2013

Location: University Hall 1203
Time: Thursdays 7:20 – 10:00 PM

Instructor: Bjorn Berg
Office: Nguyen Engineering Building 2240
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Office Hours: TBA, by appointment

Prerequisites: OR 541, OR 542, and one OR Methods course. You should be proficient in a programming language (e.g., C++, Java, Python) and familiar (or able to become so) with a math programming solver (e.g., Cplex, Gurobi).

Text Book: Birge, John R., and François Louveaux. *Introduction to stochastic programming*. Springer Science+ Business Media, 2011.

Note: An electronic version of the book is available through the university library website.

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.

Objectives: This course will provide students with an introduction to stochastic optimization, more specifically, stochastic programming. Through taking this course, you will:

- Develop a familiarity with, and an intuition for, modeling optimization problems under uncertain conditions
- Examine the problem structure and properties of stochastic programs from both a theoretical and a practical perspective
- Implement advanced solution methods
- Become familiar with the "state of the art" of stochastic programming

Schedule: The following is a tentative weekly schedule and is subject to change.

August 29 – Introduction, Modeling
September 5 – LP and Probability Review, Modeling and Stochastic Programming Examples
September 12 –Two-stage Stochastic Programs
September 19 – Modeling Chance Constraints, Stochastic IP, and Multi-stage SP
September 26 – Value of Stochastic Optimization, L-shaped Method
October 3 – Other Solution Methods, Network Problems
October 10 – Regularized Decomposition, Solvers, Catch up
October 17 – Sampling Methods
October 24 – Stochastic Integer Programs
October 31 – Multi-stage Stochastic Programs

November 7 – Bounding Methods
November 14 – Lagrangian Methods
November 21 – Stochastic Decomposition
November 28: Thanksgiving
December 5: Final Class – Probabilistic Constraints
Final Exam Time: December 12 - Project Presentations

Grading:

40% Homework Assignments
40% Research Project
20% In-class Participation and Presentations

Academic Integrity Policy:

GMU is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. Dishonesty is unfair to everyone, especially those who do their work honestly. Academic dishonesty will be fully prosecuted. All work turned in with your name is assumed to be only your own work (including homework assignments). If what you turn in duplicates others, then it is cheating (regardless of who copied who). When in doubt (of any kind) please ask for guidance and clarification.

Disability Accommodations

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474; http://ods.gmu.edu) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Email Communication

Students must use their MasonLive email account to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information.

Homework Assignment Information:

There will be approximately 4-5 assignments throughout the semester. Submissions (hard copy or via Blackboard) are due prior to the beginning of class on the due date. There will be a 20% grade reduction for each late day.

Include the following in your homework assignments:

- Your name and the assignment number
- Legibly written answers
- Problem definition
- Assumptions made
- Methods used
- Results and conclusions in words

- Some of the assignment problems will require the use of programming and/or a solver. For these problems please be sure to submit a thoroughly commented version of your code.

While I encourage you to discuss ideas related to the homework assignments with me or your classmates, every student is expected to submit their own work individually.

Note: The numerical "answers" you get are important but the focus of the grading is on the approach to the solution and your understanding of the fundamental theory that underlies the solution. Therefore you must show all of your work leading up to the final solution. Points are allocated for each step of the solution process.