ECE 6990 (Fall 2015) **Syllabus**

Robust and Stochastic Optimization

1 Course Description

Formulation and treatment of infinite and finite-dimensional robust and stochastic programs. Convex approximation techniques and performance bounds. Applications to multi-stage robust and stochastic optimization will also be considered. Specific topics include:

- Robust convex programs
- Chance constrained programs
- Random convex programs
- Multi-stage formulations
- Stochastic approximation techniques

2 Instructor Information

Instructor:	Eilyan Bitar
Office:	326 Rhodes Hall
Office Hours:	Wednesday, 4 - 5:30 PM
Email:	eyb5@cornell.edu
Phone:	(607) 255-7156
Course website:	Blackboard

3 Lectures

Lectures will be held Tuesday/Thursday (11:40 - 12:55 PM) in 407 Phillips Hall.

4 Reading Material

There is one recommended textbook for this course:

1. Ben-Tal, Aharon, Laurent El Ghaoui, and Arkadi Nemirovski. *Robust optimization.* Princeton University Press, 2009.

Lectures will also rely on several journal publications for material – a subset of which includes:

2. Nemirovski, Arkadi, and Alexander Shapiro. *Convex approximations of chance constrained programs.* SIAM Journal on Optimization 17.4 (2006): 969-996.

3. Campi, Marco C., and Simone Garatti. *The exact feasibility of randomized solutions of uncertain convex programs.* SIAM Journal on Optimization 19.3 (2008): 1211-1230.

4. Calafiore, Giuseppe, and Marco C. Campi. *Uncertain convex programs: randomized solutions and confidence levels.* Mathematical Programming 102.1 (2005): 25-46.

5. Kuhn, Daniel, Wolfram Wiesemann, and Angelos Georghiou. *Primal and dual linear decision rules in stochastic and robust optimization.* Mathematical Programming 130.1 (2011): 177-209.

5 Prerequisites

ECE 5555 or permission of instructor. Students should be comfortable with some mathematical rigor and the basics of linear algebra, probability, and convex optimization.

6 Grading

Your final grade will be based on **homework** (60%, assignments equally weighted) and **final** (40%). The final will either be exam or project based – to be determined 4 weeks into the semester.

7 Collaboration and Code of Conduct

Every student attending this course is expected to abide by the Cornell University Code of Academic Integrity, which can be found at cuinfo.cornell.edu/Academic/AIC.html. Any piece of work you turn in for credit must be your own work. Discussion with other students about specific homework problems is permitted to the extent that discussion is limited to problem approach and does not include note taking. In writing up your homework solution, you must acknowledge anyone with whom you collaborated. If you use papers or books or other sources (e.g. material from the web) to help obtain your solution, you must cite those sources. You may not discuss exam problems with other students. Please ask if you are unclear as to what constitutes excessive collaboration.

8 Misc

The final will take place in the evening to provide students with ample test time. To compensate students for the additional time commitment outside of normal class hours, two to three regular lectures will be canceled.