ECE 4520 (Spring 2014) **Syllabus**

Operation and Optimization of the Power Grid

1 Course Description

Broadly, this coarse aims to acquaint students with the economics and optimal operation of modern electric power systems. Topics include optimal power flow, economic dispatch, electricity markets, and emerging techniques for renewable energy integration. Strong emphasis will be placed on the development and application of techniques to solve convex and stochastic optimization problems. By the end of the course, students will have developed a firm grasp of optimal power system operations, the emerging challenges facing deep renewable energy integration, and tools to effectively tackle said challenges.

2 Instructor Information

Instructor:	Eilyan Bitar
Office:	326 Rhodes Hall
Office Hours:	Tuesday, 4:30 - 6:00 PM
Email:	eyb5@cornell.edu
Phone:	(607) 255-7156

Course website:	Blackboard

3 Lectures

Lectures will be held Monday/Wednesday (2:55 - 4:10 PM) in 403 Phillips Hall.

4 Prerequisites

ECE 2200, ECE 3100, and comfort with Matlab programming.

5 Textbooks

The course lectures will be self-contained. However, there are several textbooks (not required) that may serve useful as auxiliary or reference texts.

1. Glover, J. Duncan, Mulukutla S. Sarma, and Thomas J. Overbye. *Power system analysis and design.* CengageBrain.com, Fifth Edition. 2012.

2. Wood, Allen J., Bruce F. Wollenberg, and Gerald B. Sheble . *Power generation, operation, and control.* John Wiley & Sons, Third Edition. 2014.

3. Boyd, Stephen P., and Lieven Vandenberghe. *Convex optimization.* Cambridge university press, 2004. **Available online:** http://www.stanford.edu/∼boyd/cvxbook/bv_cvxbook.pdf

6 Software

We will occasionally make use of the following Matlab software packages.

1. Grant, Michael, Stephen Boyd, and Yinyu Ye. *CVX: Matlab software for disciplined convex programming.* 2008. **Available online:** http://cvxr.com/cvx

2. Zimmerman, Ray D., Carlos E. Murillo-Snchez, and Deqiang Gan. *Matpower.* PSERC, Cornell University. **Available online:** http://www.pserc.cornell.edu/matpower/

7 Grading

Your final grade will be based on **homework** (30%, assignments equally weighted), **midterm** (30%), and **final** (40%). These weights are approximate and we reserve the right to change them later. The final will either be exam or project based – to be determined 4 weeks into the semester.

8 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.

9 Misc

The midterm 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.