ECE 573: Power System Operations and Control  
Fall 2015  
CRN 37143

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Venue: 8:00 – 9:20 a.m. Tuesdays, Thursdays, Room 4026, ECEB

Office Hours: 11:00 – 12:00 p.m. Tuesdays, Thursdays, Room 4052, ECEB

Prerequisite: ECE 476 or consent of instructor; co-requisite ECE 530


These two texts are recommended but not required.

Course Syllabus

1. Overview of power system operations and control: background; the basic objectives of security and economics in power system operations and control; the security analysis framework – scope, objectives and implementation; role of the EMS (energy management system)

2. Optimal power flows: review of optimization; economic dispatch problems; formulation of optimal power flow problem; objective functions and representation of constraints; solution methods; security constrained OPF; dispatch and rescheduling applications; pricing information; role of reactive power; application to markets

3. Resource scheduling and commitment: nature of resource scheduling problem; time hierarchies; objectives and constraints; key functions and their interrelationships; unit commitment and hydro-thermal coordination; solution approaches using DP and Lagrangian relaxation; role in EMS; application to markets

4. State estimation: fundamental notions; static state estimation problem – role and formulation; the least–squares state estimation solution; constrained weighted least–squares estimation; measurement requirements; observability; bad data identification/detection, analysis and processing

5. Electricity restructuring: transition from monopoly to competition; restructuring paradigms; competitive electricity markets; market design; interrelationships between various markets; impacts of restructuring and competition; unbundling; nature of transmission services; congestion management; locational marginal prices; ancillary services; information needs

Students are assigned papers of interest for study and discussion. Homework is assigned but need not be submitted and is not graded. Homework solutions will be uploaded after the HW due date. The course grade is based on the midterm exam and the final exam. The Final Exam is comprehensive and covers all course topics.

Final exam is scheduled for Tuesday, December 17, 2015, 8:00 – 11:00 a.m.
July 24, 2015