EE 585
Power System Operation and Control

Syllabus

Instructor: Prof. Saad Alghuwainem
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Prerequisites

1. Graduate standing
2. Have taken a previous course in power (such as EE341, EE 443 or equivalent).
3. Have a knowledge of analyzing three-phase power circuits
4. Have a knowledge of using Matalb

Course Description and Scope

This course deals with modern power system generation and control problems and solution techniques.
Topics covered include: optimal dispatch of generation, unit commitment, loadflow, contingency analysis, state estimation, load-frequency control, and automatic generation control.

Textbooks:

1. Grainger and Stevenson, Power System Analysis, McGraw Hill, 1994
2. George L. Kusic, Computer-Aided Power System Analysis, Prentice Hall

Class Meetings

Time: Wednesday at 6:00 p.m.–8:30 p.m.
Room: 1C- 04

Grading Policy

Midterm Exam-1:	25%
Midterm Exam-2 :	25%
Quizzes	10%
Final Exam	40 %

Course Goals and Objectives

The objective of this course in electric power generation: operation and control are:

- Acquaint engineering students with power generation systems, their operation in an economic mode, and their control.
- Introduce students to the important “terminal” characteristics for thermal and hydroelectric power generation systems.

- Introduce mathematical optimization methods and apply them to practical operating problems.
- Introduce methods for solving complicated problems involving both economic analysis and network analysis.
- Introduce methods that are used in modern control systems for power generation systems.
- Introduce current topics in the power industry today. These include the discussion of new techniques for attacking problems arising from changes in the system development patterns, regulatory structures, and economics.

Course Scope

Topics to be addressed include:

- Power generation characteristics.
- Economic dispatch and the general economic dispatch problem.
- Thermal unit economic dispatch solution methods.
- Optimization with constraints.
- Using dynamic programming for solving economic dispatch and other optimization problems.
- Transmission system effects: transmission losses and effects on scheduling.
- Generation scheduling in systems with limited energy supplies.
- Automatic generation control.
- Interchange of power and energy with focus on interchange pricing, power pools, wheeling, and transactions involving non-utility parties.
- power flow techniques.