



IEEE Power Engineering Society



With the support of:

**Professional Engineers
Ontario**

Presents a short course on:

Power System Basics For Business Professionals

When: July 16, 2003

Where: Sheraton Centre Hotel, Toronto, ON

WHO SHOULD ATTEND

- senior and middle electric utility management who are not power engineers
- regulators, public service commission staffs
- legislators
- power traders, power marketers
- consumer groups
- policy makers, public affairs officials, and legal counsel
- managers of significant power users
- board members of electric utilities
- engineers in related fields

This course demystifies electric power systems for non-technical personnel working in this area. Topics include: how electricity is generated, transmitted and distributed, key issues in system operations, and needed background on the important policy and restructuring issues of the day, such as changes in the regulation of electric power generators and new regulatory developments in electric power distribution.

With public interest in electric power and energy systems at a new high, non-engineering personnel working in this rapidly changing industry need to know power engineering fundamentals. To meet this need, the IEEE Power Engineering Society (PES) is pleased to offer this introductory-level short course, with the support of Professional Engineers Ontario (PEO). PEO will introduce the concept of Engineering Governance.

Developed at the request of PES by the University of Illinois at Urbana-Champaign, this tutorial was first offered to rave reviews in July, 2002. It will be offered exclusively in Canada during the PES 2003 General Meeting in Toronto (for information, visit http://ewh.ieee.org/r7/toronto/pesgmt2003/technical_program.html).

Don't miss this opportunity!

Register online at <http://www.pes-gmtorontoreg.com/regform.asp>

Curriculum

Introduction and basics

- ◆ Electricity origins and development
- ◆ The value of electricity as a commodity
- ◆ Voltage and current, AC vs. DC, single phase vs. three phase
- ◆ What is the difference between power and energy?
- ◆ Reactive power, power factor and power factor correction
- ◆ Costs and characteristics of different types of generation—traditional and emerging: fossil, nuclear, hydro, wind, solar, fuel cell, microturbine
- ◆ How can electricity be stored?
- ◆ Generation, transmission, distribution
- ◆ Why are different voltage levels used?
- ◆ Why do we interconnect?

Technical issues

- ◆ Power system limits, stability and ATC
- ◆ Power system reliability, security, contingencies, reserve margins
- ◆ Power system transients
- ◆ Lightning and over-voltage/current protection
- ◆ Voltage sags and power quality

Power system operations and control

- ◆ Typical load demand cycles: daily, seasonal
- ◆ Load forecasting
- ◆ How is power transmitted from one place to another and what is involved?
- ◆ Differences between short, medium and long lines
- ◆ Why is it important to maintain frequency, voltages, synchronism, etc.?
- ◆ Active and reactive power losses, voltage drop, real and reactive power transfer
- ◆ How is frequency maintained?
- ◆ Congestion management
- ◆ The roles of an ISO RTO

Regulatory and policy issues

- ◆ History of regulation
- ◆ Federal and national organizations
- ◆ Energy efficiency—what works and are there new ideas on this front?
- ◆ The role of regulators
- ◆ Electricity restructuring
- ◆ The role of the U.S. federal vs. state governments
- ◆ What happened in California?

Faculty

George Gross, Professor of Electrical and Computer Engineering, and Professor, Institute of Government and Public Affairs, University of Illinois at Urbana-Champaign

Peter W. Sauer, Grainger Chair Professor of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

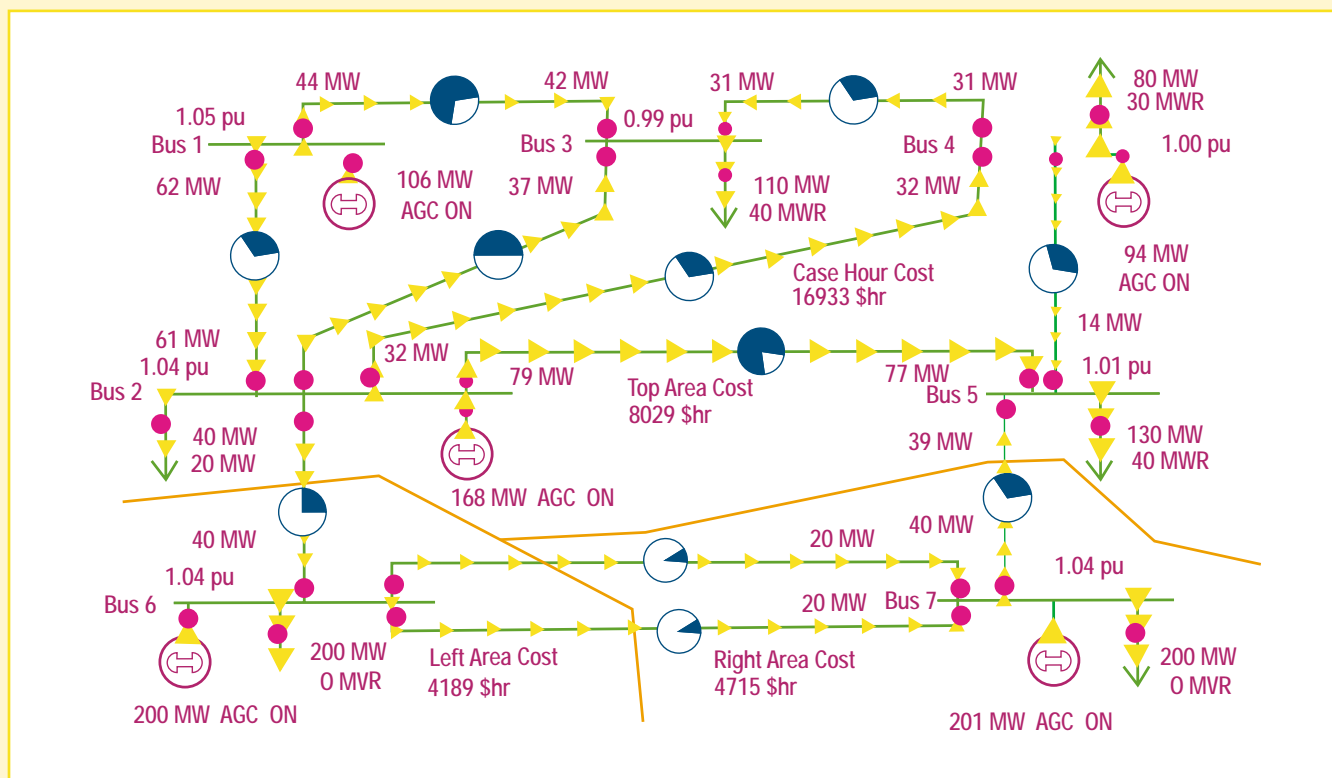
Thomas J. Overbye, Associate Professor of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

Engineering Governance

Most debate about governance focuses on compliance—the systems in place to ensure that legislative requirements are met. To date, compliance has been achieved through the standard accounting paradigm that still pervades management, with companies setting their goals in accounting terms and structuring their control, monitoring and reward systems similarly.

However, there is another dimension to governance—performance. Has there ever been an engineering and technology paradigm applied to governance?

Course Approach



To help students gain an intuitive insight into the intricacies of power system operations, the presentations will make extensive use of POWERWORLD Simulator. This simulator is an extremely user-friendly and interactive power system analysis package designed both for teaching power systems to non-power engineering audiences and for the analysis of actual power systems. The figure shows a POWERWORLD Simulator display of a seven-bus system used in the course, with animated arrows showing how real and/or reactive power flows through the system.

Cost for this interactive learning opportunity is \$495 CDN (\$330 US).

To register online, go to <http://www.pes-gmtorontoreg.com/regform.asp>. It is not necessary to register for the entire conference to attend this special techtorial.

The *IEEE Power Engineering Society* is a worldwide, non-profit association of 24,000 women and men engaged in electric power engineering. PES members are involved in the planning, research, development, construction, installation, and operation of equipment and systems for the safe, reliable, and economic generation, transmission, distribution, measurement, and control of electrical energy.

Professional Engineers Ontario (PEO) regulates the practice of professional engineering and governs the individuals it licenses and organizations it authorizes in order “that the public interest may be served and protected.”