Power System Scheduling and Operation

Training Course

Industry Need
Secure and economic operation of electric power supply systems has always been an important concern in the electric power industry. Compared to fifteen years ago, electric utilities today spend a much greater portion of their total revenues on fuel. As a result, the problem of using available fuel and resources as efficiently as possible is of major importance. Further complicating this problem is the fact that environmental concerns have given rise to controls on the operation of certain power plants and have contributed to delays in the construction of new transmission and generation facilities.

These developments have resulted in the application of more sophisticated methods to solve today's scheduling and operating problems. For example, "economic dispatch" may now include the dispatch of generators to minimize pollutants or to recognize transmission limitations as well as to achieve minimum costs.

Along with the increased complexity has come a greater need for engineers working in this area to understand basic principles and issues. This course addresses that need by providing an introduction to methods and procedures used in scheduling, operating, and controlling electric power supply systems. It is useful both as an introduction to the subject area and to provide a more formal basis for methods and techniques learned through experience.

Objectives
This course provides participants with an understanding of current methods and techniques used to schedule and operate electric power supply systems in an economic and secure manner. The course emphasizes computer techniques and advanced topics presented in a practical context. A logical sequence is followed, starting with an overview of how all of the elements fit together and then investigating each of the elements in greater detail.

Prerequisites
This course is recommended for engineers seeking an introduction to the techniques used in the electric utility industry for power system scheduling and control. Engineers currently working in scheduling and operations functions will benefit most from this course. An engineering degree with basic knowledge of electric utility systems is desirable.

Course Structure
Course duration is three days with three-hour morning and afternoon sessions. Problems will be assigned to demonstrate concepts presented in the lectures.

Documentation
The text, "Power Generation, Operation, and Control", by Allen J. Wood and Bruce F. Wollenberg, (John Wiley and Sons, Inc., second edition) is used as the primary course reference. This textbook is supplied to each student and is included in the course tuition. Supplemental lecture material is also provided.

Instructors
The course will be taught by Siemens PTI engineers with extensive experience in distribution system planning, design and operation.

Location
The course is conducted on a regular basis at Siemens PTI offices in Schenectady, NY and at other major cities throughout the United States. It is also available for presentation at a client's location by special arrangement.

Continuing Education Units
1.8 Continuing Education Units (CEU's) will be awarded for successful completion of this short course. The CEU is the nationally recognized unit for recording participation in noncredit educational programs. One CEU is equal to ten classroom hours.

PTI – Power Academy TD

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Course Outline

Day 1

- Course Overview
  - Background
  - Operation & Control Function
- Characteristics of Generating Units
  - Fossil
  - Hydro
  - Wind & Solar
  - Nuclear
  - Co-generation
- Economic Dispatch
  - Introduction to the Problem
  - Solution Techniques
  - Transmission Losses
  - Base Points & Participation Factors

Day 2

- Unit Commitment
  - Daily load forecasting
  - The Unit Commitment Problem
  - Constraints, Reserve Requirements
  - Solution Techniques
  - Applications
- Generation Control
  - Models
  - AGC
  - Implementation
  - Applications

Day 3

- Interchange Evaluations and Power Pools
  - Economy Interchange
  - Multiple Interchange Contracts
  - After-the-fact Evaluations
  - Types of Pool Operation
  - Energy Broker Systems
- Operating Security
  - Factors and Functions
  - Operator Load Flows
  - Contingency Analysis
  - Corrective Dispatch
- State Estimation
  - Theory
  - Methodology
  - Applications

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Siemens PTI has local offices in many countries throughout the world. For further information and contact to our worldwide business locations and local experts, please visit the Siemens PTI website and complete a contact form.

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