

Power Generation Series 2018

Performance Knowledge and Operations Knowledge Series Courses



GP Strategies® offers integrated power plant monitoring and training to increase overall performance.



Professional Engineers Continuing Education

Individuals are strongly encouraged to check with their specific regulatory boards to confirm that PDHs issued for courses taken from GP Strategies, a PIE and NERC Authorized Provider, will be accepted by that entity.

Combined Cycle Fundamentals

February 6 – 10, 2018 • Houston, TX
August 6 - 10, 2018 • Buffalo/Niagara Falls, NY

Simulator-Based Combined Cycle Plant Operations

August 20 - 24, 2018 • Buffalo/Niagara Falls, NY

Combined Cycle Plant Performance

January 30 - February 1, 2018 • Tampa, FL
July 25 - 27, 2018 • Buffalo/Niagara Falls, NY

Advanced Performance Analysis and Troubleshooting for Power Plants

June 18 - 22, 2018 • Buffalo/Niagara Falls, NY
September 18 - 22, 2018 • Denver, CO

Fundamentals of Power Plant Performance for Utility Engineers

June 18 - 22, 2018 • Buffalo/Niagara Falls, NY
September 17 - 21, 2018 • Denver, CO

Heat Rate Awareness

July 23 - 25, 2018 • Buffalo/Niagara Falls, NY

Reserve your space today!

 online: www.gpstrategies.com/power-plant-courses

 email: energyservicesregistration@gpstrategies.com

 call: +1.716.799.1080 or 800.803.6737



Combined Cycle Fundamentals

Course Description

This 4½-day instructor-led course is designed to discuss the principles associated with the operation of combined cycle power plants. The fundamentals of plant operation(s) are emphasized. The discussions also target the role the operating staff plays in optimizing plant operations.

Prerequisites

Basic familiarity with equipment performance test methods and power plant thermodynamics.

Course Content

- Power Plant Thermodynamic Principles
- Combined Cycle Power Generation
- Gas Turbine/Generator
- Heat Recovery Steam Generator (HRSG)
- Steam Turbine/Generator
- Auxiliary Systems
- Combined Cycle Plant Controls
- Combined Cycle Plant Operation
- Print Reading

Course Objectives

At the end of this course, students should be able to:

- Discuss the laws of thermodynamics and energy conversion
- Use a steam table to look up the properties of steam and water
- Explain the primary flow paths for fuel, air, steam, cooling water, and power
- Discuss the general purpose and basic operation of various plant systems
- Describe the purpose and primary function of each major component
- Discuss the sequence of events for a plant startup and shutdown
- Discuss current trends in combined cycle generation

Who Should Attend

This course is designed for plant operators and managers in the power industry, but will be of interest to personnel with management, operations, maintenance or supervisory experience who wish to learn more about combined cycle power plants. System operators/dispatchers will also find the course material beneficial for system operations and planning.

Course Materials

The textbook, *Combined Cycle Fundamentals*, and steam tables are provided.

Simulator-Based Combined Cycle Plant Operations*

Course Description

This 4½-day course is designed to provide hands-on operation of a combined cycle unit. Operating best practices are emphasized. The discussions and use of a high-fidelity simulator allow operators to practice and perfect routine and abnormal scenarios in a safe environment without risk to equipment.

Prerequisites

This course is designed for operators, engineers and managers in the power industry who wish to improve their skills operating a combined cycle power plant under a variety of normal and abnormal operating conditions.

Course Content

- Unit Startup and Shutdown
- Operating Under Normal Plant Conditions
- Operating Under Abnormal Plant Conditions
- Operating During Plant Upsets
- Reacting Optimally to Multiple Alarms
- Troubleshooting Unit Performance

Course Objectives

At the end of this course, students should be able to:

- Prepare the combined cycle unit for startup
- Start up the unit following normal operating practices
- Properly operate the unit under routine conditions and load changes
- Prepare the combined cycle unit for shutdown
- Shut down the unit following normal operating practices
- Interpret alarms and their relationships quickly

Who Should Attend

This course is designed for control room operators who wish to improve their skills operating a combined cycle power plant under a variety of normal and abnormal operating conditions, as well as assistant operators who are preparing to assume responsibilities for unit operation.

Course Materials

Student handout with simple operating procedures are provided.

*This course is limited to three attendees. You will have the opportunity to be added to a waitlist if there are no seats available.



Combined Cycle Plant Performance**

Course Description

This 2½-day course is focused on improving the availability, reliability, capacity, and efficiency of the combined cycle power plant. It teaches attendees how to diagnose root causes of combined cycle power plant performance deficiencies using a case study-based approach. Diagnostic flowcharts are provided and used interactively for the solutions to the case studies.

Prerequisites

Basic understanding of power plant thermodynamics and operations.

Course Content

- Introduction to Combined Cycle Plant Performance
- Thermodynamic Concepts
- Brayton Cycle Performance
- Gas Turbine Component Design and Function
- Gas Turbine Control and Protection
- Rankine Cycle Performance
- Rankine Cycle Equipment Performance
- Evaluating and Troubleshooting Combined Cycle Performance

Course Objectives

At the end of this course, students should be able to:

- Identify and diagnose root causes of capacity and efficiency degradation
- Quantify the benefits of performance recovery

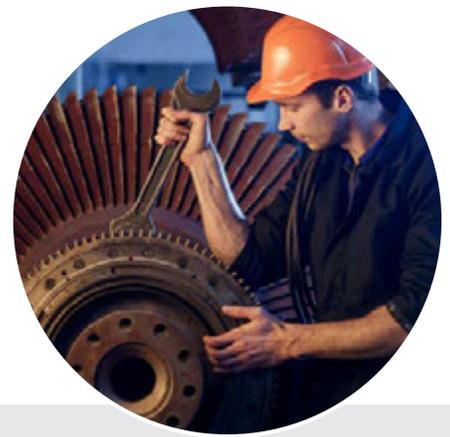
Who Should Attend

This course is designed for operators, supervisors, engineers, and management who are directly involved in the daily operation of the plant.

Course Materials

The textbook *Combined Cycle Plant Performance* with troubleshooting flowcharts are provided.

**This course incorporates material created under the sponsorship of the Electric Power Research Institute (EPRI)



Reserve your space today!

Advanced Performance Analysis and Troubleshooting for Power Plants

Course Description

This 4½-day course is designed to teach attendees how to diagnose root causes of fossil and combined cycle power plant performance deficiencies. Over 25 different case studies are presented and solved, beginning with test data on specific components, followed by pertinent performance calculations, and ending with a “root cause” analysis of the problem. Diagnostic flowpaths, using “expert system” techniques, are provided for many of the case studies. The case studies are based on GP Strategies’ extensive experience in troubleshooting and testing all types of power plant equipment. Topics are optimally arranged to allow engineers from both plant types to pick and choose the equipment of most interest to them without any loss of continuity. Attendees have the option of attending the first 3½ days on the Rankine cycle plant, the last 3½ days on the combined cycle plant, or the full 4½-day program.

Prerequisites

Basic familiarity with equipment performance test methods and power plant thermodynamics.

Course Content

- Boilers and Air Heaters
- Gas Turbines
- Feedwater Heaters
- Pumps
- HRSGs
- Condensers and Auxiliaries
- Steam Turbines
- Combined Cycle

Course Objectives

At the end of this course, students should be able to:

- Troubleshoot capacity and efficiency shortfalls of all major power plant components
- Identify where thermal losses are occurring
- Determine if problems are due to equipment or operational issues
- Act to effectively improve heat rate
- Monitor improvements and continually reassess strategies for optimum performance

Who Should Attend

This course is for experienced power plant personnel who are knowledgeable in power plant components/systems.

Course Materials

The textbook, *Advanced Performance Analysis and Troubleshooting for Power Plants*, diagnostic flowpaths, steam tables, and performance software are provided. Attendees are requested to bring a laptop computer with Microsoft® Excel™. Each attendee will receive a personal copy of the latest version of GPCALCS™ software.

Fundamentals of Power Plant Performance for Utility Engineers

Course Description

This 4½-day course is designed to teach attendees how to test and monitor coal-fired power plant equipment and improve unit heat rate. The course presents design and operating theories of power plant equipment. It also emphasizes efficiency and testing with full consideration given to the expectations and limits of component equipment. The laws of thermodynamics and the principles of heat transfer are reviewed and applied to equipment operation and efficiency. Actual test data is used to calculate turbine efficiency, condenser cleanliness, turbine cycle heat rate, turbine cycle heat rate corrections, boiler efficiency, and feedwater heater performance. The perspective of performance testing and monitoring is maintained throughout.

Prerequisites

Good working skills in algebra and graphical interpretation.

Course Content

- Overview of ASME Performance Test Codes
- Thermodynamics Review
- Overview of Boilers, Turbines, Feedwater Heaters, Condensers, Pumps, and Cooling Towers
- Test Instrumentation
- Data Evaluation

Course Objectives

At the end of this course, students should be able to:

- Recognize and use standard testing methods
- Determine the performance levels of major plant equipment
- Test performance accurately and interpret results
- Improve the efficiency of plant operations

Who Should Attend

This course is designed for engineers, engineering managers, and plant engineers.

Course Materials

The textbook, *Fundamentals of Power Plant Performance for Utility Engineers*, and steam tables are provided. Attendees are advised to bring a scientific calculator to class.



Heat Rate Awareness**

Course Description

This 2½-day course provides attendees with heat rate concepts, controllable and non-controllable losses, and the effects of component performance on operating costs for a conventional power plant. The focus will be on developing a detailed understanding of the heat rate effects of operating practices, unit optimization, and environmental compliance.

Prerequisites

Basic understanding of conventional power plant operations.

Course Content

- Power Plant Thermodynamics Review
- Calculating the Cost of Heat Rate Deviations
- Controllable Losses
- Boiler
- Turbine
- Condenser
- Feedwater Heaters
- Ancillary Equipment
- Optimization Tools
- Cycle Isolation
- Instrumentation Effects on Heat Rate
- How Does My Job Relate to Heat Rate?

Course Objectives

At the end of this course, students should be able to:

- Discuss the details of heat rate concepts
- Explain controllable and non-controllable losses
- Explain the effects of component performance on operating costs
- Discuss how heat rate affects operating practices, unit optimization, and environmental compliance

Who Should Attend

This course is designed for operators, supervisors, engineers, and management who are directly involved in the daily operation of the plant.

Course Materials

The textbook *Heat Rate Awareness*, steam tables, and a calculator are provided.

**This course incorporates material created under the sponsorship of the Electric Power Research Institute (EPRI).



online: www.gpstrategies.com/power-plant-courses

email: energyservicesregistration@gpstrategies.com

call: +1.716.799.1080 or 800.803.6737

Registration Form

5 EASY WAYS to REGISTER

 **online:** www.gpstrategies.com/power-plant-courses

 **email:** energyservicesregistration@gpstrategies.com

 **call:** +1.716.799.1080 / 800.803.6737

 **fax:** 716.799.1081

 **mail:** GP Strategies Corporation 25 Northpointe Parkway, Suite 100, Amherst, NY 14228-2213

All of our courses offer a 10% multi-registrant discount to organizations registering three or more persons for the same class at the same time. Call +1.716.799.1080 or 800.803.6737 for information on multi-course discounts.

- Fee includes textbook, other course materials, continental breakfasts, lunches, and daily beverage breaks.
- Cancellations received more than 15 working days prior to the start of the course are entitled to a full refund.
- Cancellations within 11-14 working days prior to the start of the course are subject to a 20% service charge.
- Cancellations within 10 working days or fewer prior to the start of the course and “no shows” are subject to the full fee.
- Substitutions may be made at any time.
- GP Strategies reserves the right to cancel the session at least 10 working days prior to the scheduled start. Participants will be promptly notified. However, GP Strategies cannot be responsible for travel-related expenses or reservation penalties.

Please register me for:

Combined Cycle Fundamentals

- February 6 – 10, 2018 • Houston, TX
 August 6 - 10, 2018 • Buffalo/Niagara Falls, NY

Simulator-Based Combined Cycle Plant Operations

- August 20 - 24, 2018 • Buffalo/Niagara Falls, NY

Combined Cycle Plant Performance

- January 30 - February 1, 2018 • Tampa, FL
 July 25 - 27, 2018 • Buffalo/Niagara Falls, NY

Heat Rate Awareness

- July 23 - 25, 2018 • Buffalo/Niagara Falls, NY

Fundamentals of Power Plant Performance for Utility Engineers

- June 18 - 22, 2018 • Buffalo/Niagara Falls, NY
 September 17 - 21, 2018 • Denver, CO

Advanced Performance Analysis and Troubleshooting for Power Plants

- June 18 - 22, 2018 • Buffalo/Niagara Falls, NY
 September 18 - 22, 2018 • Denver, CO

Course Fees

Combined Cycle Fundamentals	\$1,750
Simulator-Based Combined Cycle Plant Operations	\$4,250
Combined Cycle Plant Performance	\$1,050
Advanced Performance Analysis and Troubleshooting for Power Plants	
3½-Day Combined or Rankine Cycle Plants	\$1,750
4½-Day Combined and Rankine Cycle Plants	\$1,950
Fundamentals of Power Plant Performance for Utility Engineers	\$1,500
Heat Rate Awareness*	\$1,050

*\$100 discount for members of EPRI Target 71 Heat Rate and Cost Optimization. Contact GP Strategies for Discount Code.



Travel & Lodging

Participants are responsible for making their own travel and hotel arrangements. A block of rooms is set aside in a local hotel for our students. Be sure to mention GP Strategies to receive the special rate. A map and hotel information will be emailed to you with your registration confirmation.

Method of Payment: Charge my: MasterCard VISA American Express Check P.O.

Account # _____ Exp. Date _____

Amount _____ Security Code _____

Exact Name on Card _____

Name _____ Title _____

Signature _____

Company _____ Plant Name _____

Billing Address _____

City/State/ZIP _____

Country _____

Business Phone _____ Fax _____

Email Address _____

Cancellations: Applicants may cancel up to 15 working days before the first course day for a full refund. Cancellations received within 11-14 working days prior to the start of the course are subject to a 20% service charge. Cancellations 10 working days or fewer prior to the start of the course and “no shows” are subject to the entire fee. Substitutions may be made at any time.