MERCURY

Power Generation: Steam Turbines, Gas Turbines & Combined Cycle Power Plants

16 – 20 August 2027
Amsterdam (Netherlands)



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Power Generation: Steam Turbines, Gas Turbines & Combined Cycle Power Plants

Ref: 6068_301202 **Date:** 16 – 20 August 2027 **Location:** Amsterdam (Netherlands) **Fees:** 6200 Euro

Introduction

This power generation in steam and gas turbines combined cycle program provides a detailed understanding of steam power plants, gas turbines, and combined cycle plants. Each of the components, such as compressors, gas and steam turbines, heat recovery steam generators, deaerators, condensers, lubricating systems, instrumentation, control systems, transformers, and generators, are covered comprehensively.

The design, selection considerations, operation, maintenance, and economics of turbines are discussed alongside emission limits, reliability, monitoring, and governing systems. The significant improvements made to power plants during the last two decades, as well as advanced gas turbine solutions, will also be explained.

In this extensive power generation training course, participants will gain a comprehensive understanding of the systems and operations integral to the efficiency of steam turbines, gas turbines, and combined cycle power plants.

The power generation in steam and gas turbines combined cycle course covers power generation fundamentals tailored to mechanical, chemical, and product engineers, operation, maintenance professionals, and technical consultants involved in energy projects.

Targeted Groups

- Chemical, Process, and Mechanical Engineers.
- Product Engineers and Technologists.
- The Operation, Technical Service, and Maintenance Professionals.
- Engineers, Consultants, and Sales Professionals.
- Technical Professionals are responsible for interdisciplinary energy projects.

Course Objectives

By the end of this power plant training program, participants will be able to:

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- Understand components and subsystems of various types of gas turbines, steam power plants, and combined cycle plants.
- Examine the advantages, applications, performance, and economics of combined cycle plants.
- Recognize various equipment, including compressors, turbines, governing systems, combustors, deaerators, feedwater heaters, transformers, generators, and auxiliaries.
- Learn the required maintenance for gas turbines, steam power plants, combined cycles, and generators to minimize operating costs and maximize efficiency, reliability, and longevity.
- Gain insight into environmental emissions monitoring and control.
- Explore instrumentation and control systems of gas turbines and combined cycles.
- Enhance their knowledge of predictive and preventive maintenance, reliability, and testing.
- Acquire a thorough understanding of the selection considerations and applications of steam power plants and combined-cycle plants.

Targeted Competencies

At the end of this power generation in steam and gas turbines combined cycle course, the target competencies will be able to:

- Understand the technical features of centrifugal compressors and steam turbines.
- Select the optimal type and size of equipment for a given industrial application.
- Estimate equipment deterioration and inefficiency.
- Apply best practices and techniques for root cause analysis.
- Choose the most efficient remedies and troubleshooting techniques in operation.

Course Content

Unit 1: Steam Power Plants

- Review of thermodynamics principles.
- Steam power plants.
- The fire-tube boiler.
- The water-tube boiler.
- The steam drum.
- Superheaters and reheaters.
- Steam turbines.
- Reheaters.
- Condensers.
- Feedwater heaters.
- Understand efficiency and heat rate.
- Supercritical plants.
- Economics of steam power plants.

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Unit 2: Steam Turbines and Auxiliaries

- Turbine types.
- Compound turbines.
- Turbine control systems.
- Steam turbine maintenance.
- Understand steam generators, heat exchangers, and condensers.
- Power station performance monitoring.
- The turbine governing systems.
- Steam chests and valves.
- Turbine protective devices.
- Turbine instrumentation.
- Lubrication systems.
- Gland sealing system.
- Understand frequently asked questions about turbine-generator balancing, vibration, analysis, and maintenance.
- Features enhancing the reliability and maintainability of steam turbines.

Unit 3: Gas Turbines and Compressors

- Gas turbine fundamentals.
- Overview of gas turbines in power generation.
- Gas turbine design.
- Understand gas turbine calculations.
- Gas turbine compressors.
- Learn about compressor auxiliaries, off-design performance, stall, and surge.
- Centrifugal compressors are components, performance characteristics, balancing, surge prevention systems, and testing.
- Dynamic compressor performance.
- Compressor seal systems.
- Learn about dry seals, advanced sealing mechanisms, and magnetic bearings.

Unit 4: Combined Cycle Power Plants

- Difference between combined cycle vs. simple cycle power plants.
- Combined cycle's technology overview.
- Single-shaft combined cycle power generating plants.
- Learn about economic and technical considerations for combined cycle performance and enhancement options.
- Overview of combined cycle operation and maintenance.
- Understand the latest improvements in combined cycle technology.

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Unit 5: Transformers and Generators

- Fundamentals of electric systems.
- Introduction to machinery principles.
- Transformers.
- Transformers components and maintenance.
- AC machine fundamentals.
- Synchronous generators.
- Understand generator components, auxiliaries, and excitation.
- Understand what generator testing, inspection, and maintenance are.