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

30 June - 4 July 2025

Tbilisi (Georgia)

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

course code: E6068 From: 30 June - 4 July 2025 Venue: Tbilisi (Georgia) - course Fees: 4500 Euro

Overview:

INTRODUCTION

This programme 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. The design, selection considerations, operation, maintenance, and economics of turbines as well as emission limits, reliability, monitoring and governing systems will also be covered. The significant improvements that were made to power plants during the last two decades will also be explained.

PROGRAMME OBJECTIVES

- **Learn** about components and subsystems of the various types of gas turbines, steam power plants, and combined cycle plants
- **Examine** the advantages, applications, performance and economics of combined cycle plants
- **Learn** about various equipment including compressors, turbines, governing systems, combustors, deaerators, feed water heaters, transformers, generators and auxiliaries
- **Discover** the maintenance required for gas turbines, steam power plants, combined cycles and generators to minimize their operating cost and maximize their efficiency, reliability, and longevity
- **Learn** about the monitoring and control of environmental emissions
- **Discover** instrumentation and control systems of gas turbines and combined cycles
- **Increase** your knowledge of predictive and preventive maintenance, reliability and testing
- **Gain** a thorough understanding of the selection considerations and applications of steam power plants and combined-cycle plants

TRAINING METHODOLOGY

The instructor relies on a highly interactive training method to enhance the learning process.This method ensures that all the delegates gain a complete understanding of all the topics covered. The training environment is highly stimulating, challenging, and effective. The participants will learn by case studies. They will be able to apply all the concepts to their own organization.

PROGRAMME SUMMARY

This programme provides an in-depth understanding of all the equipment and systems used in steam power plants, gas turbines, and combined cycle plants. Computer simulation, design, selection considerations, operation, testing, maintenance and economics of all these power generating plants

as well as emission limits, monitoring and governing systems will also be covered thoroughly.

This programme examines the advantages and disadvantages of each type of power generating plants. The reliability, life cycle cost, profitability, refurbishment, and life extension methods of each type of power generating plants are also covered in detail.

PROGRAMME OUTLINE

DAY 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
- Efficiency and Heat Rate
- Supercritical Plants
- Economics of Steam Power Plants

DAY 2 - Steam Turbines and Auxiliaries

- Turbine Types
- Compound Turbines
- Turbine Control Systems
- Steam Turbine Maintenance
- 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
- Frequently Asked Questions about Turbine-Generator Balancing, Vibration, Analysis and Maintenance
- Features Enhancing The Reliability and Maintainability of Steam Turbines

DAY 3 - Gas Turbines & Compressors

- Gas Turbine Fundamentals
- Overview of Gas Turbines
- Gas Turbine Design
- Gas Turbine Calculations
- Gas Turbine Compressors
- Compressors Auxiliaries, Off-Design Performance, Stall, and Surge
- Centrifugal Compressors - Components, Performance Characteristics, Balancing, Surge

Prevention Systems, and Testing
- Dynamic Compressors Performance
- Compressor Seal Systems
- Dry Seals, Advanced Sealing Mechanisms, and Magnetic Bearings

DAY 4 - Combined Cycle Power Plants

- Combined Cycle vs Simple Cycle Power Plants
- Combined Cycle's Technology Overview
- Single-Shaft Combined Cycle Power Generating Plants
- Economic and Technical Considerations for Combined Cycle Performance & Enhancement Options
- Combined Cycle Operation and Maintenance
- Latest improvements in Combined Cycle Technology

DAY 5 - Transformers & Generators

- Fundamentals of Electric Systems
- Introduction to Machinery Principles
- Transformers
- Transformers Components and Maintenance
- AC Machine Fundamentals
- Synchronous Generators
- Generator Components, Auxiliaries, and Excitation
- Generator Testing, Inspection, and Maintenance