TECHNICAL
EDUCATION
ACADEMY

School of Engineering

COURSE PROGRAMME

000370

ELPO011 - Power generation using steam or gas turbines and combined cycle power plants

This program provides a detailed understanding of steam power plants, gas turbines, and combined cycle plants.



Learn from the Best in the Business!

Course overview

Intermediate level

Why take this course

This 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.

Steam turbines of several types, which have widely varying configurations and applications, are used extensively in the process industries. These steam turbines represent a significant part of the capital and operating costs of most plants, so that optimizing their selection is of major economic importance.

This course will cover the operating principles of turbines, specifications, their design, thermodynamics, effects of efficiency on operating costs, energy usage, effect on plant costs, special materials of construction, selection, troubleshooting, and maintenance.

Who it is for and how it helps

Senior technicians, operators, supervisors, superintendents and corporate engineering, plant planning and design, systems design, equipment selection and evaluation, and equipment maintenance areas. Also, equipment and systems specialists in engineering contractor firms and managerial and supervisory individuals responsible for operations and maintenance functions.

What you will learn

- List all components and subsystems of the various types of gas turbines, steam power plants, and combined cycle plants;
- Explain the advantages, applications, performance, and economics of combined cycle plants;
- Talk about various equipment including compressors, turbines, governing systems, combustors, deaerators, feedwater heaters, transformers, generators and auxiliaries;
- Explain 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;
- Talk about the monitoring and control of environmental emissions;
- Discover instrumentation and control systems of gas turbines and combined cycles;
- Improve their 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.

Curriculum

Modules 01–02

01 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

02 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

Curriculum

Modules 03–05

03 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

04 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

05 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

Participation and contacts

Joining the programme

Contact the Academy and quote course code 000370 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

mail@tecedu.org
www.tecedu.academy

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