

Scandinavian Academy
Training Center

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Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Power Generation: Gas Turbines Co Generation Combined Cycle Plants Wind Power Generation and Solar Power

Code	City	hotel	Start	End	price	Language - Hours
EE-146SA	Abha	Hotel Meeting Room	2027-05-16	2027-05-20	12950 SR	En - 25

INTRODUCTION

This programme provides a detailed understanding of steam power plants, gas turbines, co-generation, combined cycle plants, wind and solar power generating 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 co-generation plants and combined cycles as well as emission limits, reliability, monitoring and governing systems will also be covered. The significant improvements that were made to co-generation, combined cycles plants, wind and solar power generating 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, co-generation, combined cycle plants, wind turbines and generators, wind turbine farms, and solar power generation
- Examine the advantages, applications, performance and economics of co-generation, combined cycle plants, wind turbines and generators, wind turbine farms, and solar power generation
- Learn about various equipment including compressors, turbines, governing systems, combustors, deaerators, feed water heaters, transformers, generators and

auxiliaries, wind turbines and generators, wind turbine farms, and solar power generating plants
- Discover the maintenance required for gas turbines, steam power plants, combined cycles, generators, wind turbines and generators, and wind turbine farms 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 co-generation, combined-cycle plants, wind turbines and generators, wind turbine farms, and solar power generation

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, co-generation, combined cycle plants, wind farms, and solar power generating 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
- Co-generation Plants
- Arrangement of Co-generation plants
- Economics of Co-generation 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
- Combined Cycles
- Single-Shaft Combined Cycle Power Generating Plants
- Economic and Technical Considerations for Combined Cycle Performance Enhancement Options
- Dynamic Compressors Technology
- 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 - Co-generation Plants, Wind and Solar Power Generation

- Applications of Co-generation and Combined Cycle Plants
- Selection Considerations of Combined Cycles and Co-generation Plants
- Co-generation Application Considerations
- University of Toronto Central Steam, Co-generation and District Heating Plant

- Economics of Combined Cycles Co-generation Plants
- Wind Power Generation
- Economics of Wind Power
- Wind Power Turbine Generators - Brushless Double-Feed Generators
- The Solar Power
- Solar Photovoltaic Technologies
- Economics of Solar Power Systems

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

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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