

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: Pipes and Piping Systems Optimisation

Code	City	hotel	Start	End	price	Language - Hours
OG-141SA	Al Baha	Hotel Meeting	2027-03-21	2027-03-25	13950 SR	En - 25

The Course

The present state of the art design of piping systems is based on the close interaction and collaboration between system designers and operators. The operator’s experience with running complex piping systems for long periods is an important factor in improving the design. The most delicate design problems are encountered during the expansion of systems, when they are made larger or more complex. For a piping system to operate in a problem-free manner, the design and installation of a piping system requires attention to multiple factors. During the past few decades, pipeline systems and technologies have been progressing at a fast pace in all aspects of the design, operation, and automatic control. The systems have grown in size and intricacy, and today’s trends in the industry are aimed at enlarging the flow rates, pipe diameters and working pressures for a wide variety of fluids to be handled, including very complex and difficult ones. All of these factors impose strong requirements on careful design, precise operation and complex control Pipeline operation engineers and managers have to be sufficiently familiar with the details of fluid flow in piping systems as well as with modern technologies, in order to make informed decisions on various technical aspects of the designed system and its future operation. There is a need for detailed monitoring of everyday operation, as well as computer-based centralized automatic control of operation of large systems. At the same time, environmental concerns and safety issues require highly sophisticated monitoring and control systems.

Highlights of the course are:

- This course will present the most updated approach to the design, implementation, operation and maintenance of piping systems and pipelines
- The course will enable better understanding of principles that are the basis for

proper selection and sizing of the pipes and piping systems and the corresponding accessories
- Fluid movers: pumps and compressors will be explained in detail, with important aspects of their interaction with the piping systems
- The transport of complex fluids will be discussed, as well as piping systems of complex geometry (pipe branching piping network, transients in operation, etc.)
- The system for monitoring and automation control will be discussed

The Goals

This course will enable the participants to achieve the following:

- Appreciation of technical characteristics of piping systems, their applications in process and chemical industry
- Knowledge of methods of hydraulic and mechanical design of piping systems according to existing world standards and codes
- Procedures for the selection of best piping systems based on the optimization technique, resulting in pipe diameter and cost of material
- Use of methods of diagnosing and estimating the degree of deterioration of pipelines
- Guidelines for improving efficiency of the overall piping system

The Process

The course is an assortment of lectures, discussions and workshops with active delegate participation and team work. The focus will be on physical principles and technical reasoning with their justification and clarification. There will be comprehensive workshops with the real-life cases, and calculation procedures with results discussed. A daily dialogue will be held with participants with the goal of reviewing key learnings gained and inspiring delegates to exchange views from professional experiences.

The Benefits

This course will benefit the delegates through:

- Greater knowledge of methods used to assess and calculate the main design parameters of a system for the transport of the given fluid for the given application
- Improved familiarity with all aspects of the piping systems encountered in everyday industrial practices
- Clear understanding of guidelines for selection and sizing the piping systems
- Knowledge on how to cope with modern trends in pipeline industry regarding ever-increasing demands for larger capacities and more efficient operation
- Readiness to implement the best practices for efficient operation, improved reliability, maintenance and problem troubleshooting

The Results

The course will benefit the company through:

- Efficiently operated piping system and pipelines by skilled personnel will result in energy saving and in the reduction of overall costs of the plant operation
- Performance of the company in the long run will be improved by an adequate selection and sizing of piping systems that have the best overall efficiency
- Personnel in the maintenance department will be able to follow the best practices for inspection, maintenance, repair and alteration
- Problem-free operation of piping system will result in reduction of downtime for repairs and alterations and reduce the operation costs in the technological process
- Well maintained piping systems will prolong the life of the plant and significantly reduce overall costs and in the same time lower the risks and impact on the environmental

The Programme Content

Day One

Overview of Piping Systems

- Main features of various types of piping systems
- Classification of piping systems based on the design and application
- World standards and codes on design properties of pipes
- Main steps in design and construction of piping systems
- Physical and transport properties of fluids: density, viscosity, particle contents
- Basics of flow analysis in pipes - laminar and turbulent flow regimes

Day Two

Calculation of Pressure and Velocity Distribution in Piping Systems

- Calculation of pressure losses and horsepower required for fluid transportation
- Selection and sizing of pipes for different applications: liquids, gases, slurries, etc.
- Calculation of minor losses in piping system
- Basics of mechanical design: selection of pressure class of pipe and stress ratios
- Hydrostatic testing: allowable operating pressure and hydrostatic test pressure
- Pipe construction: pipes above-ground and pipes buried

Day Three

Pumps and Compressors Used in Pipelines

- Pump interaction with the system, cavitations: work in series and parallel
- Multi-pump stations and tanks
- Pump calculation and selection
- Compressor interaction with the system, avoiding surge, stall and choking
- Multi-compressor stations and gas holders

- Compressor calculation and selection
- Pipe networks and pipe branching: problems with transients and their control

Day Four

Control Valves in Pipelines

- Control valves: selection, sizing and cavitation issues
- Flow measurements and monitoring instrumentation
- Pipeline system automation control
- Guidelines for pipeline installation, operation and maintenance
- Inspection, examination and testing of pipelines
- Vibration of pipes and pipelines and their mechanical support and anchorage

Day Five

Operation and Maintenance of Piping Systems

- Leak detection and prevention and failure risk analysis
- Pipeline protection for prevention of corrosion and erosion
- Environmental concerns: impact of above-ground and buried pipelines
- Off-shore pipelines: design and operation
- Special consideration for safety and supervision
- Pipeline feasibility study and economic analysis: capital and operation costs

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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