SCANDINAVIAN ACADEMY
For Training and Development

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Course: Safety Instrumentation & Emergency Shutdown Systems

Code	City	Hotel	Start	End	Price	Language - Hours
HS-645	Amsterdam (Netherlands)	Hotel Meeting Room	2026-09-28	2026-10-02	5950 €	En - 25

Course Introduction:

Safety Instrumented Systems (SIS) and Emergency Shutdown Systems (ESD) are critical components in industrial operations to prevent hazardous incidents, protect personnel, and ensure compliance with international safety standards. Effective management of these systems enhances reliability and mitigates risks in high-risk environments such as oil and gas, chemical processing, and power generation industries.

This training program provides professionals with in-depth knowledge of safety instrumentation principles, emergency shutdown system design, functional safety standards, and best practices for maintenance and testing. Participants will gain practical expertise through real-world case studies, hands-on exercises, and system simulations.

Course Objectives:

By the end of this course, participants will be able to:

- Understand the fundamentals of Safety Instrumented Systems (SIS) and Emergency Shutdown Systems (ESD).
- Apply international safety standards such as IEC 61508, IEC 61511, and ANSI/ISA 84.
- Identify hazards and conduct risk assessments for safety instrumentation.

- Design, implement, and test emergency shutdown systems.
- Develop best practices for functional safety lifecycle management.
- Optimize maintenance strategies for safety instrumentation and shutdown systems.

Target Audience:

- Safety and Instrumentation Engineers
- Process Control and Automation Engineers
- Maintenance and Reliability Professionals
- HSE and Risk Management Personnel
- Plant Managers and Supervisors
- Professionals involved in the design, operation, and maintenance of industrial safety systems

Course Content:

Fundamentals of Safety Instrumented Systems (SIS) and ESD

- Introduction to safety instrumentation and its role in industrial safety
- Overview of Emergency Shutdown Systems (ESD) and their critical functions
- Principles of functional safety and risk reduction
- Safety Integrity Level (SIL) concepts and classifications
- Industry regulations and compliance requirements
- Case study: Analyzing SIS failures and their impact

Hazard Analysis and Risk Assessment Techniques

- Understanding process hazards and risk factors
- Introduction to Hazard and Operability Study (HAZOP)
- Layer of Protection Analysis (LOPA) methodology
- Safety Requirement Specification (SRS) development
- Risk assessment tools for safety system evaluation

- Workshop: Conducting a risk assessment for an industrial process

Design and Implementation of Safety Instrumented Systems

- Key components of SIS: sensors, logic solvers, and final control elements
- Redundancy, fault tolerance, and fail-safe design considerations
- System architecture and reliability analysis techniques
- Testing and validation of SIS components
- Best practices in system integration and commissioning
- Workshop: Developing an SIS design for a critical process

Emergency Shutdown Systems and Functional Safety Lifecycle

- Role of ESD systems in accident prevention and mitigation
- Shutdown logic and sequencing principles
- Functional safety lifecycle phases and requirements
- Verification, validation, and functional testing procedures
- Alarm management and emergency response planning
- Case study: ESD system failures and lessons learned

Maintenance, Testing, and Optimization of Safety Systems

- Preventive and predictive maintenance strategies for SIS and ESD
- Periodic testing and proof testing methodologies
- Diagnostic tools for system health monitoring
- Failure analysis and troubleshooting techniques
- Regulatory compliance audits and documentation best practices
- Final assessment and certification review

The Scandinavian Academy for Training and Development 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 and Development.

Program Timings:

- 9:00 AM to 2:00 PM in Arab cities.
- 10:00 AM to 3:00 PM in European and Asian cities.

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.