Safety Instrumented Systems (SIS) Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Safety Instrumented Systems (SIS) Training Course is designed to build strong competency in process safety, functional safety, and industrial automation risk reduction. This training equips engineers, technicians, and safety professionals with in-depth knowledge of IEC 61511, IEC 61508, SIL (Safety Integrity Level) assessment, hazard mitigation, and lifecycle management of safety systems used in high-risk industries such as oil & gas, petrochemical, power plants, and manufacturing.

In today's era of digital transformation, Industry 4.0, and smart process automation, SIS plays a critical role in preventing catastrophic failures, protecting human life, and ensuring asset integrity. This course provides practical exposure to LOPA (Layer of Protection Analysis), HAZOP integration, SIS design validation, proof testing strategies, and safety compliance audits, enabling learners to implement globally accepted functional safety standards in real-world industrial environments.

Programme Curriculum

Safety Instrumented Systems (SIS) Training Course

Introduction

Safety Instrumented Systems (SIS) Training Course is designed to build strong competency in process safety, functional safety, and industrial automation risk reduction. This training equips engineers, technicians, and safety professionals with in-depth knowledge of IEC 61511, IEC 61508, SIL (Safety Integrity Level) assessment, hazard mitigation, and lifecycle management of safety systems used in high-risk industries such as oil & gas, petrochemical, power plants, and manufacturing.

In today's era of digital transformation, Industry 4.0, and smart process automation, SIS plays a critical role in preventing catastrophic failures, protecting human life, and ensuring asset integrity. This course provides practical exposure to LOPA (Layer of Protection Analysis), HAZOP integration, SIS design validation, proof testing strategies, and safety compliance audits, enabling learners to implement globally accepted functional

safety standards in real-world industrial environments.

Course Duration

5 days

Course Objectives

1. Master Functional Safety Lifecycle Management
2. Understand Safety Instrumented System (SIS) architecture and design principles
3. Perform SIL Classification and Risk Assessment using LOPA methodology
4. Apply HAZOP study integration with SIS design
5. Develop competency in Process Hazard Analysis (PHA)
6. Implement Emergency Shutdown (ESD) and Safety Interlocks systems
7. Conduct Proof Testing and Maintenance Optimization of SIS
8. Analyze Risk Reduction Strategies in High-Risk Industries
9. Ensure Compliance with Global Functional Safety Standards
10. Build skills in Alarm Management and Critical Safety Functions
11. Design Redundant and Fault-Tolerant Safety Systems
12. Perform SIS Validation, Verification, and Functional Testing
13. Strengthen expertise in Cybersecurity for Safety Instrumented Systems

Target Audience

1. Instrumentation and Control Engineers
2. Process Safety Engineers
3. Electrical Engineers in Oil & Gas Industry
4. Maintenance and Reliability Engineers
5. HSE (Health, Safety & Environment) Professionals
6. Automation and PLC Engineers
7. Plant Operations Supervisors
8. Industrial Safety Consultants

Course Modules

Module 1: Fundamentals of Functional Safety & SIS

- Overview of IEC 61508 & IEC 61511 standards
- Safety lifecycle phases
- SIS vs BPCS (Basic Process Control System)
- Risk reduction concepts
- Safety integrity concepts
- **Case Study:** Refinery explosion prevention using SIS interlocks

Module 2: Hazard Identification & Risk Assessment

- HAZOP methodology
- Risk matrices and scenario analysis
- Layers of Protection Analysis (LOPA)
- Scenario frequency estimation
- Safety requirements specification
- **Case Study:** Chemical plant toxic leakage risk assessment

Module 3: SIL Determination & Verification

- SIL levels (SIL 1–4)
- Risk graph method
- LOPA-based SIL allocation
- Independent protection layers
- Safety integrity calculations
- **Case Study:** SIL verification in offshore oil platform shutdown system

Module 4: SIS Design & Engineering

- Architecture design principles
- Redundancy
- Sensor-logic-final element design
- Fail-safe design strategies
- Engineering documentation
- **Case Study:** Gas compressor station emergency shutdown system design

Module 5: Programmable Logic Controllers in SIS

- Safety PLC vs standard PLC
- Logic solver programming
- Diagnostic coverage techniques
- System integration
- Fault detection methods
- **Case Study:** Power plant turbine trip system automation

Module 6: Proof Testing & Maintenance

- Proof test intervals
- Diagnostic testing methods
- Failure rate analysis
- Maintenance planning
- Reliability-centered maintenance
- **Case Study:** Refinery valve failure prevention through proof testing

Module 7: Validation, Verification & Compliance

- SIS validation procedures
- Functional safety audits
- Documentation requirements
- FAT & SAT procedures
- Compliance reporting
- **Case Study:** Commissioning validation of LNG terminal SIS

Module 8: Advanced Topics in SIS

- Cybersecurity in SIS
- Digital transformation in safety systems
- Smart sensors & IIoT integration
- Alarm rationalization
- Emerging trends in functional safety

- **Case Study:** Cyberattack prevention in automated chemical plant SIS

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
28 Sep 2026	02 Oct 2026	Online	$1,000
28 Sep 2026	02 Oct 2026	Physical	$1,500

Start Date	End Date	Location	Price
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0
28 Sep 2026	02 Oct 2026	Physical	$0

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com