

FUNCTIONAL SAFETY ENGINEER (TÜV RHEINLAND) SIS TRAINING

TVC Functional Safety Services FZ-LLC is delighted to introduce the Functional Safety Engineer (TÜV Rheinland) SIS – a comprehensive 3.5-day training course designed in accordance with the current IEC 61511 normative requirements. This vocational training caters to Safety Instrumented System (SIS) Professionals in the Process Industry and is part of the esteemed competency review program offered by TÜV Rheinland Functional Safety Program series, globally recognized for its excellence and rigor.



COURSE DATES AND LOCATIONS:

19th – 22nd November 2024, Quality Airport Hotel Stavanger - NORWAY



COURSE OBJECTIVES

The primary objective of this course is to equip all engineers engaged in safety instrumented systems with fundamental and essential knowledge about functional safety. This knowledge is grounded in the leading international functional safety standards, namely IEC 61508 and IEC/ISA 61511.

A secondary objective is to provide attendees with the opportunity to obtain the globally recognized FS Engineer (TÜV Rheinland) certificate upon successful completion of the exam.

WHY SHOULD YOU ATTEND?

According to IEC/ISA 61511, it is explicitly stated as a 'Normative' requirement that:

- Individuals involved in safety lifecycle activities must possess the necessary competence to fulfill their responsibilities.
- There must be a documented procedure in place for managing the competence of all individuals involved in the Safety Instrumented System (SIS) life cycle.
- Periodic assessments should be conducted to verify the competence of individuals in their respective roles and whenever there is a change in personnel.
- Any entity providing a service or product in compliance with IEC/ISA 61511 must have a Functional Safety Management system in place.

This course, along with the examination and certificate, presents a unique opportunity for you to demonstrate your competence in the field of Functional Safety to your clients, colleagues, and management. Success in the final examination serves as tangible evidence of your proficiency in functional safety, enhancing your professional reputation and career prospects.

Enhance and Validate YOUR Functional Safety Competency!



COURSE PREREQUISITES

In accordance with the TÜV Rheinland Functional Safety Program:

- Minimum 3 years' experience in the field of functional safety
- University degree (Master or Bachelor degree in Engineering)
–OR–
equivalent engineer level responsibilities status confirmed by the employer

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COURSE PROVIDER

TVC Functional Safety Services FZ-LLC was established as an independent entity with a singular focus: to deliver unbiased and expert training and consultancy services to the process industry. Our team comprises industry-leading professionals who specialize in worldwide Functional Safety and IACS Cybersecurity Training and Consultancy Services. We cater to a diverse clientele including equipment manufacturers, consultancy organizations, EPCs, and end-users across various sectors such as Oil & Gas, Chemical, Petrochemical, Pharmaceutical, LNG, Mining, Refining, and Petroleum Industries.

With a wealth of experience spanning over 30 years in the industrial domain, we provide consultancy support across all phases of the safety lifecycle. Our practical training courses are designed to bridge the gap between theory and practice, utilizing hands-on examples derived from our extensive expertise. We pride ourselves on delivering training sessions and seminars that are renowned in the Process Industry for their simplicity, practicality, and professionalism.

Furthermore, our trainers are accredited by TÜV Rheinland, ensuring that our courses are certified and held to the highest standards of quality and excellence.



COURSE INFORMATION

- Preparation: Recommended reading, IEC61511 and/or GMI SIL manual – 4th edition chapter 61511 & SRS
- Duration: 3 consecutive vocational training days + ½ day exam the 4th day morning max 4 hours
- Course material: 2 handouts with all slides & exercises-homework questions-abbreviations (paper or electronic depends on face to face or virtual type of training), GMI SIL manual – 4th edition paper or eBook depending on availability
- Recommended: Foresee ample time after the training, every evening review the home work questions
- Language used: English material and depends on location English, Hindi or Dutch spoken
- Exam details: 60 Multiple Choice Questions – 25 Open Question – max 1 point per question - No negative points – No mathematical calculations – passing criteria minimum 75% - Pen or pencil allowed – English paper dictionary allowed
- Retake exam: Allowed 1 retake exam, within maximum 1 calendar year from the first exam date, without re-following the complete training again. Registration and retake fee apply

TERMS AND CONDITIONS

- Registration is valid only upon receipt of registration form and full payment at least 4 weeks before the course starts or at the time of booking after this time.
- Eligibility requirements needs to be duly filled in, signed and returned electronically at least 1 week before the course starts. Hard copies can be brought to the course additionally
- In the event of cancellation by the participant within 3 weeks of the course start date, no refund is offered but the participant may attend any alternative location/venue organised by www.tinovc.com within 1 year at no extra cost. If an alternative course is not undertaken within one year then a full fee would become applicable to any future training.
- In the event of cancellation by the organisation at any time, full refunds will be given on any payments made. The organisation will not be liable for any other costs incurred by the participant.
- Price: 30.800,-NOK (including 3 days course, exam, and certification fee)
- For availability and registration, please contact: info@tormatic.no



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COURSE CONTENT

Introduction to Functional Safety

- Modern history of disasters
- What is safety?
- Legal status IEC61511
- Overview of legal requirements
- Layers of protection
- Safety Instrumented System
- Safety Integrity Level
- Problems with safety systems
- Safety system failures
- What is Functional Safety?
- Functional Safety Standards

Management of Functional Safety

- Lifecycle concept 61508/61511
- Functional Safety Management
- Competency
- Risk evaluation and management
- Safety Planning
- Implementation and monitoring
- Functional Safety Assessment
- Functional Safety Audit
- SIS configuration management

Planning the Safety System

- Safety lifecycle structure/planning
- FS management system
- Verification & Validation plan
- Safety Requirement Specification

Verification & Application Program

- Verification planning
- Verification testing
- Application program verification

Process Hazard & Risk Assessment

- Hazard & Risk definition
- Tolerable risk and ALARP
- Risk management
- Hazard Identification Techniques, FMEA, FTA, HAZOP
- Hazard Analysis Techniques, ETA, dispersion modeling, bowtie
- Hazard Analysis Techniques ETA
- Risk Reduction Techniques, risk matrix, risk graph
- Security Risk Assessment, digital mapping, Security Levels, Security Assurance Levels, Foundational Requirements

Allocation Safety Function to layers

- Layer Of Protection Analysis LOPA
- Typical IPL characteristics
- LOPA working example
- LOPA pros and cons
- LOPA CCPS books references
- SIF operating modes and Safety Integrity Requirements
- LOPA pros and cons
- LOPA CCPS books references
- SIF operating modes and Safety Integrity Requirements

Safety Requirement Specifications

- SRS general requirements
- SIF description requirements
- MTTR-MRT, etc.
- Application Program SRS

SIS Design and Engineering, AP development

- General requirements H/W
- Safety Manual as per IEC61508
- Hardware concepts
- IEC61511 SIF - mode of operation
- Safety - vs Process - HFT
- Diagnostics - vs Proof - test
- IEC61508 Safe Failure Fraction
- Architectural constraints Route 2H - Route 1H
- Selection of devices/field devices
- Maintenance and testing requirements
- Quantification of Random Failures
- Three barriers to clear to claim SIL
- General requirements AP
- Application Program (AP) design
- V-model lifecycle documentation
- AP implementation
- AP verification and testing
- AP methodology and tools

Installation, Commissioning and Validation

- Installation plan and documentation
- Activities, procedures and techniques
- Validation FAT - SAT

Operation and Maintenance

- Planning operation/maintenance
- Procedures operation/maintenance
- Bypass - MOS
- Proof test procedure for every SIF
- Training for operators/maintenance personnel

Modification

- Modification objectives
- Input needed
- Change vs Modification
- Before you start modification
- During modification
- After modification
- FSA before you begin

Decommissioning

- Procedures, analysis and authorisation
- SIF requirements

Wrap up

- Summary
- Exam preparation

Student exercises

- With the student exercises, the participants will have the opportunity to put the learned theory into practice
- Failure classification
- Hazard and risk analysis (FMEA, FTA & HAZOP)
- Selecting the appropriate SIL using Risk Matrix and Risk Graph
- Safety availability versus Process availability using HFT
- Design a Safety Integrity Function
- Selection and comparing devices
- Accident documentary (video)
- Questions & Answers