

FS Engineer SIS training

Based on IEC61511 edition 2.0

Online and Classroom Instructor-Led Training

Improve your Functional Safety Competency

GM International in cooperation with TVC Functional Safety Services are pleased to recommend the Functional Safety Engineer (TÜV Rheinland) online and classroom instructor-led **Training for Safety Instrumented System Professionals**, presented by world wide renowned Functional Safety Expert, **Tino Vande Capelle**.



COURSE OBJECTIVES

The main objective is to provide all engineers involved in safety instrumented systems with elementary and necessary knowledge about functional safety, based on the leading international functional safety standards 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.

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COURSE PROVIDER

Tino Vande Capelle (www.tinovc.com):

Tino is providing 'INDEPENDENT' Functional Safety (FS) Consultancy as freelance & self-employed. Capitalizing on his 30+ years of process safety sector experience, offers a unique and practical approach of the IEC 61508:2010 & IEC61511:2016 FS standards in the industry.

Tino has trained Functional Safety for more than 2500+ engineers in 150 different classes worldwide and still counting.

Tino is a Senior FS Expert (TÜV Rheinland, ID#109/05) & Trainer for Safety Instrumented Systems (SIS) of the TÜV Rheinland Functional Safety Program as an accepted course provider. He is currently the only remaining active trainer from the original 4 trainers who joined the program from the beginning in 2005.



COURSE INFORMATION

- **Course dates:** check [here](#)
- **Course type:** 'Classroom' OR 'Online' instructor-led training via ZOOM
- **Course language:** English
- **Duration:** 3,5 days
- **Course exam date:** check [here](#)
Exam can be taken online or at one of Exam Centres.

PREREQUISITES

In accordance with the TÜV Rheinland Functional Safety Program:

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

FEES AND CONTACTS

Registration is valid only upon receipt of registration form and full payment. Please contact us for detailed information about fees. The price includes:

- 2 handouts with all slides & exercises-homework questions-abbreviations, GMI SIL Manual - 4th edition hard copy
- Registration fees and certificate of attendance
- Upon successful completion of the exam a FS Engineer (TÜV Rheinland) certificate and a listing on the TÜV Rheinland website

The training course contains both theoretical instructions and practical exercises.

Contact us to find out more: training@gminternational.com

The background of the top section is a grayscale photograph of an industrial facility, likely a refinery or chemical plant. It features a long, elevated walkway with a railing, supported by vertical posts. In the distance, several large cranes are visible against a light sky. The image is partially obscured by a large, curved blue graphic element that sweeps across the bottom of the text area.

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EXAM - RULES AND REGULATIONS

The applicant has to attend three consecutive days online or classroom instructor-led training course given by TVC Functional Safety Services FZ-LLC. Additionally, the applicant needs to comply to the Eligibility Requirements prerequisites before writing the exam.

Both online and classroom exam are a closed book, that will be written under surveillance either at location or over ZOOM platform.

No mobile phone or recording devices are allowed, calculator is not needed to complete the exam.

The Classroom exam contains 85 questions (60 multiple choice – 60 points and 25 open questions – 25 points) with a maximum duration of 4 hours under surveillance.

The Online exam is in two parts:

1. There are 70 multiple choice questions – 70 points with a maximum duration of 90 minutes over a web platform called CLASSMARKER under surveillance over ZOOM platform (webcam without virtual background & microphone muted)
2. There are 3 open interview questions – 15 points with a maximum duration of 20 minutes over ZOOM platform (webcam without virtual background).

The participants will be asked before the online exam starts, to move the webcam around in the room, to show the surrounding/table/ etc. and will have to formally identify by ID, Passport or Driving license. Both online part 1 & 2 will be recorded as evidence for the exam proctoring.

EXAM Summary

There are in total 85 points to score, the passing criteria is set at 75% (63.75/85) by TÜV Rheinland in able to achieve your personal FS ENG SIS certificate and #ID number listed on www.certipedia.com.

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.

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FS TRAINING PROGRAM

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

Safety Requirement Specifications

- SRS general requirements
- SIF description requirements
- MTRR-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
- Safety versus HFT
- Design a Safety Integrity Function
- Define device level safety functions
- Selection and comparing devices
- Accident documentary (video)
- Questions & Answers