



FUNCTIONAL SAFETY ENGINEER (TÜV RHEINLAND) SIS TRAINING

Exloc Instruments (UK) Ltd are pleased to recommend UK based Functional Safety Engineer (TÜV Rheinland) vocational Training for Safety Instrumented System Professionals, presented by Worldwide renowned Senior Functional Safety Expert, Tino Vande Capelle

Organised by:

2018 COURSE DATES AND LOCATIONS:

- 10th to 13th April - Saddleworth, Nr Manchester
- 19th to 22nd June - Aberdeen
- 1st to 4th October - Saddleworth, Nr Manchester
- 27th to 30th November - Milton Keynes



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 61508:2010 and IEC 61511:2016. A second objective is to give the attendants the possibility to obtain the worldwide acknowledged FS Engineer (TÜV Rheinland) certificate upon successful participation in the exam

WHY SHOULD YOU ATTEND?

IEC61511:2016 clearly indicates as a 'Normative' requirement:

- That anybody involved in safety lifecycle activities shall be competent to carry out the activities for which they are accountable
- That a procedure shall be in place to manage competence of all those involved in the SIS life cycle
- That a periodic assessments shall be carried out to document the competence of individuals against the activities they are performing and on change of an individual within a role
- That anyone supplying a service or product in compliance to the IEC61511 shall have a Functional Safety Management system

Take advantage of this course, examination and certificate to prove your clients, peers and management, your competency in the field of Functional Safety. Success in the final examination confirms your functional safety knowledge on your personal name, adding a great value to your professional career and image

Improve and Confirm 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

- [Tino Vande Capelle](#) is providing 'INDEPENDENT' and 'VENDOR NEUTRAL' 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. Checkout some [feedback](#) from previous participants
- 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 joined the program from the first year in 2005 and is currently number 2 on the [list of all trainers](#) on the TÜV Rheinland website.



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 paper syllabuses: handouts with all slides & exercises-homework questions-abbreviations, 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 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 (£2250.00 + VAT per participant) at least 6 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 4 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.
- For availability and registration, please contact:

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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 & Answer