



FS Engineer Course

TÜV Rheinland



notra

GM INTERNATIONAL
TECHNOLOGY FOR SAFETY



As a partner for GM International, Notra is pleased to recommend the Functional Safety Engineer (TÜV Rheinland) vocational Training for Safety Instrumented System Professionals, presented by world wide renowned Functional Safety Expert, Tino Vande Capelle.

COURSE OBJECTIVES

*Improve your
Functional Safety
competency!*

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 61511.

A second objective is to give anybody attending the course the opportunity to have his or her functional safety competency confirmed by the TÜV Rheinland upon successfully passing the exam.

WHY SHOULD YOU ATTEND

IEC 61508 ed2.0, released in April 2010, 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.

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.



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PREREQUISITES

In accordance with the FS Engineer (TÜV Rheinland) 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.

COURSE INFORMATION

- **Course dates:** 24 - 27 May 2016
- **Course exam date:** One day after the course.
- **Course language:** Dutch.
- **Duration:** 3 days + 4 hours exam.
- **Participants:** min. 15 - max. 25
- **Timing:**

DAY	TIME	PROGRAM
24 - 26 May	8.30- 10.30	Morning Session- first part
	10.30- 10.45	15 minutes Break
	10.45- 12.45	Morning Session- second part
	12.45- 13.30	Max. 45 minutes Lunch Time
	13.30- 15-30	Afternoon Session- first part
	15.30- 15.45	15 minutes Break
	15.45- 17.00	Afternoon Session- second part
27 May	8.30- 12.30	Exam Day

FEES

Please contact us for detailed information about fees.

The price includes:

- Course material, GM International SIL manual and SIL informative poster.
- 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
- Refreshments and lunch for 4 days.

The training course contains both theoretical instructions and practical exercises.

CONTACTS AND REGISTRATION

The registration form is downloadable at www.gmintsr.com/training.

The form is to be filled and sent by email to: g.smeman@notra.nl

Registration is valid only upon receipt of registration form and payment.

For more detailed information or any other question please contact

E-mail: g.smeman@notra.nl



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EXAM - RULES AND REGULATIONS

The applicant has to attend the 3 consecutive days training course given by TinoVC.
The Eligibility Requirements forms must be completed, signed and supported with the necessary documents (University degree or statement letter from employer).
The maximum duration of the exam is 4 hours.

There are 85 questions:

- 60 Multiple Choice questions to be answered by selecting A-B-C or D. Only 1 will be the most complete and correct answer. Every good answer will be 1 point. (There are no negative points for wrong answers).
- 25 Open Questions to be answered in a written form. Every single question can score anything between 0 and 1 (There are no negative points for wrong answers).

The passing criteria is 75%, so you need minimum 63.75 points in able to pass the exam.
All exams are monitored by TÜV Rheinland, which will issue the successful participants their personal certificate.

What you will need:

- A pen or pencil / eraser- both are acceptable.
- A bilingual English-..... dictionary is allowed, but not a must.
- You do not need a calculator to complete this exam.

What is absolutely forbidden:

- Mobile telephone.
- Photo/video- camera or 'any' recording enabled devices.
- Course manual, notes or summaries.

Re-Exam:

The retake needs to take place within max 1 calendar year from the first exam date without re-following the complete training again. You are free to choose a location in one of the upcoming TinoVC trainings currently released on both the TinoVC website (www.tinovc.com) & TÜV Rheinland website (www.tuvasi.com).

You will need to register at least 4 weeks before the event is due in able to comply with the administration regulations, and pay for TUV certification fee.

After 1 calendar year from the first exam, a complete course (and fee) will be obliged again.

COURSE PROVIDER

Tino Vande Capelle (www.tinovc.com):

Tino is providing 'INDEPENDENT' Functional Safety (FS) Consultancy as freelance & self-employed. Capitalizing on his +28 years of process safety sector experience, offers a unique and practical approach of the IEC 61508 & 61511 FS standards in the industry.

In August 2005, Tino has become a FS Expert (TÜV Rheinland) & Trainer for Safety Instrumented Systems (SIS) with the International Process Industry leading TÜV Rheinland FS Program from the TÜV Rheinland Group.

His FS Expert (TÜV Rheinland) ID is 109/05 and can be found on the TÜV Rheinland website (www.tuvasi.com).



FS TRAINING PROGRAM

Introduction to functional safety

- 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

The basics of functional safety

- Functional safety management
- Lifecycle concept
- Documentation
- Verification & Validation
- Assessments & Audits
- Modifications
- Competency of people

Hazard & Risk Analysis

- Hazard & Risk definition
- Tolerable risk
- Risk management
- Hazard Identification Techniques, FMEA, FTA, HAZOP
- Hazard Analysis Techniques ETA
- Risk Reduction Techniques, risk matrix, risk graph, LOPA
- Safety Functions
- Safety Requirement Specification

Planning the safety system

- Planning for end users (integrators)
- Realisation safety system
- Three important documents
- Requirements for suppliers

Hardware design

- Hardware lifecycle
- Hardware concepts
- Hardware fault tolerance
- Diagnostics, Proof test
- Safe failure fraction
- Architectural constraints

- Reliability analysis
- Markov modeling
- MEDA
- Failure Data

Software design

- Software lifecycle
- Safe software
- Three types of software
- Software testing
- V-model
- Measures to avoid failures
- Measures to control failures

Certification and Proven In Use

- Certification & compliance
- Safety Manual requirements
- Certificates & reports
- Proven in use, how to use?
- Reliability data, sources

Using the Safety System

- Installation and commissioning
- Safety Validation
- Operation, maintenance and repair
- Modification and retrofit

Student exercises

- With the student exercises, the participants will have the opportunity to put the learned theory into practice
- Failure classification
- Verification
- Hazard and risk analysis (FMEA, FTA & HAZOP)
- Selecting the appropriate SIL
- Safety versus Availability
- Design a Safety Integrity Function
- Define device level safety functions
- Selection and comparing devices
- Accident documentary (video)
- Questions & Answers

Wrap up

- Summary
- Exam preparation