Training.
HW/SW Design acc. to IEC 61508.

This vocational qualification training of the **TÜV Rheinland Functional Safety Program** supports engineers (and/or persons working in functional safety business) to deepen their knowledge and their experience in order to achieve a worldwide acknowledged know how and practical experience within the area of functional safety according to the IEC 61508 international standard.

Engineers who are working in the field of functional safety for many years have the possibility to obtain an official verification of their expertise. By passing a final exam successfully they will receive a Functional Safety Engineer (TÜV Rheinland) certificate

This worldwide acknowledged certificate states that specific knowledge within the field of "**Hardware/Software Design**" has been achieved.

The training provides knowledge which enables developers to transfer the requirements of the standard IEC 61508 most effectively while developing their safety-related products.

Contents.

Introduction

- Functional safety of electric, electronic and programmable systems

Safety Philosophy

- Definition of risk, principle of risk reduction
- Comparison and relation of classification systems to each other

International Standard IEC 61508

- General methods and requirements
- Consideration of life cycle aspects of safety-related systems and components
- Requirements concerning management of Functional Safety
- Requirements for the evaluation/judgement of Functional Safety
- Definition of requirements according to the chosen SIL
- Meaning of Safety Integrity Level (SIL)
- Consideration of faults and fault modells
  - Fault: random fault, systematic fault, fault caused by handling, fault during operation
  - Fault modells: stuck-at-, DC- and extended DC-fault modell
- Definition of measures against faults
  - Fault avoidance
  - Fault detection and -control
- Consideration during design-, development- and production phase
  - Safety requirement specification
  - Verification- and validation plan
- Calculation of the probability of failure on demand (PFD)
  - Derivation of Reliability Block Diagram for different systems
  - Derivation of formula for calculation of PFD
  - Architectural constraints, Safe Failure Fraction and diagnostic coverage
  - Influence of proof-test-interval, diagnosic-test-interval on probability figures
  - Redundant systems and common cause factor
  - Example for PFD calculation
  - Soft errors

Application of safety-related Bus Systems

- Basic requirements for the application of bus-systems
- Considerations of probability of transmission faults
  - Reliability of data transmission
  - Bit-failure rate
  - Failure-rate and failure-detection

Information / Registration

TÜV Rheinland of North America
E-Mail info@us.tuv.com

http://education.tuv.com/tuv-functional-safety-program

Further Information.

Agenda

1st Day

1. Introduction, overview of the TÜV Rheinland Functional Safety Program
2. Introduction into safety engineering
3. Application of the international standard IEC 61508 Part 1: General requirements and management of functional safety

Discussion

2nd Day

1. Examples concerning management of functional safety
2. Application of the international standard IEC 61508 Part 2: Requirements of E/E/PES
3. Determination and evaluation of safety-related parameter (practical examples)

Discussion

3rd Day

1. Application of the international standard IEC 61508 Part 3: Software Requirements
2. Practical example concerning part 3
3. Requirements of tools for configuration and parametrisation of safety systems
4. Requirements of safety-related bus systems acc. to IEC 61508.

Discussion

4th Day

Exam

Target Group

Developers, testers, project managers, QM managers who are mainly engaged in the development of programmable electronic safety systems on the basis of the acknowledged international standard IEC 61508.

Exam

Duration: approx.	3,5 – 4 hours
Start:	9:30 Uhr
End:	approx. 1 or 2 p.m.

FS Engineer (TÜV Rheinland) Certificate

Participants who wish to obtain the „**FS Engineer (TÜV Rheinland)**“ certificate have attend the complete training and pass the exam as well as have to fulfil the following requirements:

1. a minimum of **3 years experienc**e in the field of functional safety.
2. University degree (Master's or Bachelor's degree in Engineering)

or

Equivalent engineer level responsibilities status certified by employer.

All FS Engineers (TÜV Rheinland) are listed on the website of TÜV Rheinland for Functional Safety www.tuvasi.com.

Attendants who do not wish to attend the exam and do not wish to obtain the certificate, do not have to fulfil any requirements.

Fee

US$ 3,500
Includes exam, training proceedings, lunch and refreshments

Information / Registration
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