

# TÜV Rheinland FUNCTIONAL SAFETY ENGINEER - SAFETY INSTRUMENTED SYSTEMS

The course is designed to provide participants with elementary and necessary knowledge about functional safety, based on the international standards IEC 61508 and IEC 61511.

**Course Code** SFSE

**Duration** 4 days

**Max Class Size** 8

**Prerequisite** At least 3 years experience in the field of functional safety. Bachelor degree or equivalent as certified by the employer.

Pass score is 75%. Successful participants will receive certificate from TÜV Rheinland

## Who should attend this course?

For instrument engineers, application engineers, site engineers, project managers, operation engineers, maintenance engineers and all those who are involved in the design, realization, maintenance and operation of safety systems.

### Day 1

Introduction to Functional Safety  
International safety standards IEC 61508 and 61511  
- The 5 main pillars of the standards  
HAZOP - SIF - SIL  
- Hazard and risk assessment, Determine SIF and SIL, SIL verification

### Day 2

Safety Engineering  
- DTS and ETS states, redundancy, safety architectures, reliability modeling, sensor validation, overrides-bypasses-inhibits, process safety time and system response time, Logic Solver architectures  
Functional Safety Management  
Failures and hardware fault tolerance  
- Random hardware failures and their modes  
- Failure mode effect analysis, Safe Failure Fraction (SFF), Hardware Fault Tolerance (HFT)

### Day 3

Common cause influences and various errors  
- The beta factor and systematic and human failures  
Safety calculations  
- Safety parameters, formulas, proof testing  
Session for questions (afternoon session-optional)

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## Day 4

Examination

