

## ISO 26262:2018 Automotive Functional Safety Certification



Course Duration: 5 Days - 8 Hours/day

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## Seminar Content

This five-day seminar covers all 12 parts of the ISO 26262 standard to give those attending the information necessary to understand the standard, and move your organization toward conformance. ISO 26262 is the Functional Safety standard that is applied to Safety Related Systems that include electric/electronic systems installed in production passenger vehicles, trucks & busses, and motorcycles. The course combines presentations with hands-on work and is conducted in English. There is an optional ISO 26262 Certification exam at the end of the class for those wanting to demonstrate and document their knowledge.

This course combines presentations, along with in-class group exercises to put what you are learning into practice. Concepts are reinforced by a running case study of an air bag system. Forms are used to complete the exercises as a part of the integrated workshops that include Item Definition, Hazard Analysis and Risk Assessment (HARA), Safety Goals, ASIL levels, Functional Safety Concept, Technical Safety Concept, and Hardware/Software Interface.

## Learning Objectives

- ❖ Tailor the necessary activities to support vehicle safety lifecycle management, development, production, operation, service, and decommissioning
- ❖ Information provided in the class can be used for ISO 26262 implementation

- ❖ Understand functional safety aspects of the entire development process including requirements specification, design, implementation, integration, verification, validation, and configuration.
- ❖ Understand the risk-based approach for determining risk classes Automotive Safety Integrity Levels (ASILs)
- ❖ Use ASILs for achieving an acceptable residual risk
- ❖ Provide requirements for validation and confirmation measures to ensure a sufficient and acceptable level of safety is being achieved

## Seminar Outline

### Daily Agenda (approximate, based on class discussions)

#### Day One

- ❖ Chapter 1: Introduction and Overview to ISO 26262
- ❖ ISO 26262 Purpose, Scope and Framework Part 1 — Definitions — T&B Focus
- ❖ Chapter 2: Management of Functional Safety (Part 2)
- ❖ Safety Culture
- ❖ Project Dependent Safety Management
- ❖ Safety Case
- ❖ **Breakout Exercise 1: Safety Case Outline**
- ❖ Confirmation Measures
- ❖ Chapter 3: Production and Operation (Part 7)

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- Chapter 4: Safety Element out of Context (Part 10)
- Chapter 5: Concept Phase (Part 3)
- Item Definition
- **Breakout Exercise 2: Item Definition**

### Day Two

- Chapter 5: Concept Phase (Part 3) (cont'd)
- Hazard Analysis and Risk Assessment (HARA)
- Severity, Exposure and Controllability
- Safety Goals
- **Breakout Exercise 3: HARA**
- Functional Safety Requirements
- **Breakout Exercise 4: Functional Safety Requirements**
- Chapter 6: ASIL-Oriented and Safety-Oriented Analyses (Part 9)
- Example Scenario
- Safety Analyses in ISO 26262
- Chapter 7: System Level Development I (Part 4)
- Technical Safety Concept
- Hardware - Software Interface (HSI)

### Day Three

- Chapter 8: Hardware Level Development I (Part 5)
- Specification of Hardware Safety Requirements
- Hardware Design

- Evaluation of the Hardware Architectural Metrics
- Evaluation of Safety Goal Violations Due to Random Hardware Failures
- Chapter 9: Evaluation of Hardware Elements (Part 8)
- Classification of Evaluated Hardware Element
- Hardware Evaluation
- Proven-in-Use Argument
- Chapter 10: Hardware Level Development II (Part 5 revisited)
- Initiation of Product Development at the Hardware Level
- Hardware Integration and Verification
- Chapter 11: Software Level Development (Part 6)
- General Topics for Product Development at the Software Level
- Specification of Software Safety Requirements

### Day Four

- Chapter 11: Software Level Development (Part 6) (cont'd)
- Software Architectural Design
- **Breakout Exercise 6: Walkthrough vs. Inspection**
- Verification by Review
- Control Flow Analysis and Data Flow Analysis
- Software Unit Design and Implementation

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- Software Unit Verification and Testing Coverage Metrics
- Software Integration Testing
- Chapter 12: System Level Development II (Part 4 revisited)
- Item Integration and Testing
- System Integration and Testing
- Vehicle Level Integration
- Safety Validation
- Functional Safety Assessment
- Release to Production
- Chapter 13: Supporting Processes (Part 8) Integration of ISO 26262 with ISO 9001 or IATF 16949
- **Breakout Exercise 7: Integration with Other Standards**

## Day Five

- Chapter 13: Supporting Processes (Part 8) Cont'd
- Distributed Development
- Specification and Management of Safety Requirements
- Configuration Management
- Change Management
- Verification
- Documentation Management System
- Qualification of Software Tools
- **Breakout Exercise 8: Confidence in Tools**
- Qualification of Software Components

- Evaluation of Hardware Elements
- Proven in Use Argumentation
- Interfacing an Application that is Out of Scope of ISO 26262
- Integration of Safety-Related Systems not Developed According to ISO 26262
- Chapter 14: Guideline on Application of ISO 26262 to Semiconductors (Part 11)
- Chapter 15: Adaption of ISO 26262 to Motorcycles (Part 12)
- Chapter 16: ISO 26262 Implementation Strategy

**Optional ISO 26262 Certification Exam –**  
Final 3 hours of Day Five

## Three Levels of Certification

### Level 1

- Functional Safety Engineer Provisional (FSEP)

### Knowledge Requirements:

- 1 week of Functional safety training and candidates must pass a three hour final exam.

### Prerequisites:

- At least three years of relevant professional experience,

### Level 2

### Functional Safety Engineer (FSE)

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## Knowledge Requirements:

- ❖ 1 week of Functional safety training and candidates must pass a three hour final exam.

## Prerequisites:

- ❖ One case study demonstrating experience in Functional Safety which can be verified. The case study should show a broad understanding from Safety Plan to Safety Case (work products)
- ❖ Interview
- ❖ At least 5 years of relevant industry experience.

## Level 3

## Functional Safety Expert (FSX)

## Knowledge Requirements:

- ❖ 1 week of Functional safety training and candidates must pass a three hour final exam.

## Prerequisites:

- ❖ Two case studies demonstrating ability to do confirmation measures, evidence of communication.
- ❖ Interview
- ❖ At least 10 years of relevant industry experience.

## Who Should Attend

Those involved in the design, development, and production of electrical and electronic based vehicle products, including the systems, software and hardware engineers, and managers. Basically, all those responsible for the development and implementation of hardware and software systems in motor vehicles.

Participants should be, or plan to be, actively managing, or involved in, or aware of electrical and/or electronic items, systems, or elements that are incorporated in motor vehicles. And have the abilities, education, and experience required for the above roles.

## Seminar Materials

Each participant will receive a seminar manual including case studies.

## Pre-Requisite

Participants should be involved in or aware of software and hardware development as it relates to the motor vehicle industry.

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