exida Functional Safety, Security, & Reliability
www.exida.com

ONLINE CFSE TRAINING

exida Can Show you the Way

Online CFSE Training

Personnel that design, implement, maintain, and operate safety-instrumented systems are required to be competent in the activities that they have been assigned. Although this requirement is self-evident, it is also codified into national and international standards. The CFSE Governance Board administers and grades the tests. Information on applications and fees can be found at www.cfse.org.

exida provides training to prepare individuals for this competency test. Through on-line training, exida has developed a more convenient way to prepare for this test.

CFSE certification is good way to show standards compliance during internal audits of end-user facilities and equipment vendor development programs.

Additionally, it is an effective way for engineering firms and systems integrators to demonstrate, and for end-users to verify, the competency of contracted personnel who are performing safety lifecycle services.

exida has developed a program including a study guide and a series of courses specifically targeting the CFSE test. These courses are now available in an on-line training format. The courses are broken up into concise and effective lessons.

The lessons and their descriptions can be found on the back of this brochure. The lessons include downloadable course materials, video clips of instructors, streaming audio of lecture notes, and email question and answer sessions. CFSE exams are also available from other certification agencies.

This full set of over twenty on-line lessons provides an excellent review for the Certified Functional Safety Expert (CFSE) exam . The lesson can also form the basis of a solid skills development program for both new and established safety engineers. The full set of lessons cover the main areas of safety engineering including aspects of safety management, applications, hardware and software design considerations. The recommended license duration is one month to provide sufficient time for the participant to properly comprehend and digest the material in the most productive way. The full program is recommended for engineers, technicians, risk analysts, and process safety management personnel.

What do I need?

For best performance when using exida on-line training, it is recommended you have high-speed Internet access (DSL, Cable, T1, or T3) . 56K modems work just fine, but you may experience slight delays when downloading MP3 files. Also, Microsoft Internet Explorer browser 5.0 and up is required. Netscape and AOL browsers will not work.

LESSONS IN THE ONLINE TRAINING PACKAGE INCLUDE:

1. Safety Instrumented Systems Introduction: describes the basics of safety instrumented systems (SIS). Definitions are provided. Standards are introduced. The context of a SIS within an automation system is described. The basics of SIS design rules are listed. This lesson provides an introduction to the vocabulary and the main issues involved in SIS.

2. The Safety Lifecycle: describes the safety lifecycle, an engineering process described by several international standards for the analysis, design and operation of safety instrumented systems. The lesson presents the different lifecycle requirements of various standards and describes the process in moderate detail. This lesson is intended for engineers, technicians, risk analysts, process safety management and general plant management.

3. IEC61508 Overview: provides an overview of IEC 61508, an international standard for functional safety. The various parts of the standard are described, with suggestions and comments on the practical application of this standard in project work. An overview of the objectives and requirements is presented.

4. IEC61511 Overview: This lesson provides an overview of IEC 61511, an international standard for functional safety for the process industries. The various parts of the standard are described, with suggestions and comments on the practical application of this standard in project work. An overview of the objectives and requirements is presented.

5. Principles of Risk Management: The fundamental concepts of risk and risk management are presented in this lesson. These include goals, terms and definitions, potential hazards, regulatory issues and relevant standards. The general categories of accident prevention methods are reviewed.

6. Introduction to Process Hazard Analysis: describes the process hazard analysis (PHA) process. The lesson covers the most commonly used methods of PHA including checklist, what if?, HAZOP, FMEA and appropriate equivalent methods. Regulatory and documentation requirements are described.

7. Identifying Safety Instrumented Functions: describes how to identify safety instrumented functions given the typical documentation including the PHA results and P&ID drawings. The information needed for each SIF is described with examples of information sources.

8. Consequence Analysis Overview: Starting with an explanation of key terms, this lesson builds an understanding of the primary principles of consequence analysis. It describes the main methods that are used to estimate the magnitude of a process accident in terms of an effect zone. The lesson also provides an overview of the range of consequences that are possible in process plants, how they can be systematically analyzed, and the consequences that are most likely in a given situation.

9. Introduction to Likelihood Analysis: defines likelihood analysis and describes the statistical background. Terms and definitions are provided. Event trees are defined and described. Outcome probability calculation examples and exercises are provided.

10. Layer of Protection Analysis: Layer of Protection Analysis (LOPA) is defined with relevant terms and definitions. General techniques are presented with examples and exercises. Failure probability calculations are described along with sources of failure data.

11. Qualitative SIL Selection: General methods for safety integrity level selection are presented including the hazard matrix, calibrated hazard matrix, risk graph and calibrated risk graph. The risk issues including personnel protection, environmental protection and asset protection are described along with exercises.

12. Quantitative SIL Selection: Methods for quantitative and semi-quantitative safety integrity level selection are described in this lesson. Different methods including frequency based targets, individual risk targets and risk cost are described along with exercises.

13. Safety Lifecycle Documentation: The general requirements for safety lifecycle documentation are covered. These include documentation control, version control, approvals, management of documentation change and documentation ease of use. Several examples are provided.

14. Safety Requirements Specification Format: The purpose and format of a safety requirements specification (SRS) is described. All needed information for a SRS is covered along with potential information sources. Different methods for documenting functionality is described including plain text, cause and effect diagrams and logic diagrams. This lesson is intended for engineers, technicians, risk
analysts, process safety management and general plant management.

15. Functional Safety Management: covers all aspects of safety planning, process, certification, competency and testing. This lesson introduces FSM and describes all the activities required in an effective FSM program.

16. Verification and Validation: defines verification and validation and describes the requirements for each based on IEC 61508. Requirements include planning, responsibility and documentation. This lesson is intended for engineers, process safety management and general plant management.

17. Rules of Probability: explains basic rules of probability needed for those involved in safety instrumented system analysis and design. It introduces probability with examples and exercises. The basic rules are covered in a practical way with SIS design context explained.

18. Basic Reliability Engineering: describes failure, stress versus strength, and explains general failure rate models. It provides terms and definitions from reliability engineering and covers the basics needed for a better understanding of safety integrity level verification.

19. FMEA Introduction: describes a failure modes and effects analysis (FMEA), the information needed to do one, the procedure used, the background and the benefits of the different types of FMEA. An example is given for a small system. This lesson is intended for engineers, technicians, risk analysts, process safety managers and others taking the CFSE exam in applications or development.

20. System Reliability Engineering: covers reliability engineering techniques used for system level evaluation. It covers system level failure, failure modes, terms and definitions. It describes system level evaluation including reliability block diagrams, Markov models and fault trees.

21. Fault Trees: describes fault trees, a system level reliability and safety evaluation technique. The advantages and disadvantages of this technique are discussed. It includes model construction and model solution and discusses potential pitfalls and limitations. Many examples and exercises are included.

22. Markov Models: describes Markov models, a system level reliability and safety evaluation technique. The advantages and disadvantages of this technique are discussed. The lesson covers model construction, model solution and provides many examples and exercises.

23. SIL Verification: describes the steps required in order to do SIL Verification. Given a specific safety instrumented function, the steps required to build and solve a reliability and safety model are presented. The main issues of failure rate data and model complexity are covered.

24. SIS Validation Testing: covers the procedures, responsibilities, and checklists associated with the pre-commisioning and pre-startup activities required to verify and demonstrate that the SIS will operate according to the SRS. Activities associated with Pre-Startup Acceptance Testing and Pre-Startup Safety Reviews are covered in detail.

25. SIS Online Testing: covers the importance and limitations of on-line testing, how test frequencies are established and optimized, responsibilities and procedures for completing the testing, and the type of documentation that has to provided and completed for the testing. An example detailing the on-line testing procedure for a SIF will be discussed.

26. ALARP: describes the As Low As Reasonably Practicable (ALARP) principle used to establish risk reduction targets by many companies. The general principles of tolerable risk and tolerable risk determination are described. The course also explores translating this risk tolerance into a form that can be used as a starting point for safety system analysis.Functional Safety Management: The functional safety management course reviews safety lifecycle implementation and explains the entire process needed to achieve cost effective safety in SIS equipment. Training, documentation, maintenance procedures, and operational considerations are explained.