



ADVANCED DIPLOMA OF ELECTRICAL AND INSTRUMENTATION (E&I) ENGINEERING FOR OIL AND GAS FACILITIES

MODULE DETAILS

MODULE 21: Safety Instrumentation and Emergency Shutdown Systems for Oil and Gas (IEC 61511 and IEC 61508)

Nominal duration: 2 weeks (16 hours total time commitment)

This time commitment includes the preparation reading, attendance at each webinar (1 hour plus 15-30 minutes for discussion), and the time necessary to complete the assignments and further study.

MODULE PURPOSE

This module has been designed for project managers and engineers involved with hazardous processes, and focuses on the management, planning and execution of automatic safety systems in accordance with IEC 61511, the international standard for process industry safety controls.

IEC 61511 has been recognised by European safety authorities and by USA-based process companies as representing the best practices available for the provision of automatic safety systems. The standard captures many of the well-established project and design techniques that have been described, since 1996, in ANSI/ISA standard S84 whilst introducing many newer principles based on the master standard IEC 615108.

IEC 61511 (published in 3 parts) combines the principles of IEC 61508 and S84 into a practical and easily understood code of practice specifically for end users in the process industry. This module is structured into two major parts to ensure that both managers and engineering staff are trained in the fundamentals of safety system practices.

PRE-REQUISITE MODULES/UNIT(S)

Module 12: Electrical Equipment in Hazardous Areas

ASSESSMENT STRATEGY

To evaluate the achievement of the learning outcomes; written assignments, group projects and practical exercises are set.



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SUMMARY OF LEARNING OUTCOMES	1. Analyze safety life cycle, risk reduction and safety targets [21.1]
	2. Plan system integration, documentation , diagnostics and testing [21.2]
Learning Outcome 1	Analyze safety life cycle, risk reduction and safety targets [21.1]
Assessment Criteria	1. Describe the basics of safety instrumented systems [21.1.1]
	2. Discuss IEC 61511 and the safety lifecycle [21.1.2]
	3. Outline HAZOP methods and hazard analysis for defining risk reduction requirements [21.1.3]
	4. Discuss the principles of risk reduction and safety allocation [21.1.4]
	5. Determine SIL by using methods based on IEC 61511 [21.1.5]
	6. Describe SIS configurations for both safety and availability targets [21.1.6]
	7. Discuss the selection of sensors and actuators for safety duties [21.1.7]
Learning Outcome 2	Plan safety system integration, documentation , diagnostics and testing [21.2]
Assessment Criteria	1. Describe reliability analysis methods and programs based on IEC 61511 [21.2.1]
	2. Discuss the selection of safety controllers [21.2.2]
	3. Discuss system integration and application software for safety controllers [21.2.3]
	4. Describe the documentation and validation of SIS systems [21.2.4]
	5. Discuss diagnostics and proof testing of safety instrumentation [21.2.5]



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Delivery Mode

A combination of asynchronous and synchronous e-learning delivery comprising a judicious mix of interactive online web conferencing, simulation (virtual labs) software, remote online labs, online videos, Power Points, notes, reading and study materials (in pdf, html and word format) accessed through the Moodle Learning Management System (LMS).