COURSE OVERVIEW IE0311
Instrumented Protective Functions

Course Title
Instrumented Protective Functions

Course Date/Venue
Session 1: June 15-19, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: November 10-14, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
IE0311

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Safety Instrumented Function Conceptual. It covers the safety instrumented systems (SIS) and the importance of SIS in process industries; the difference between SIS and basic process control systems (BPCS); the safety lifecycle phases, safety instrumented function (SIF), safety integrity level (SIL) and risk reduction factor; the hazard identification methods, risk assessment and layers of protection analysis (LOPA); the basic concepts of redundancy and the types of redundant architectures; the levels and significance of SIL, SIL determination methods and SIL verification; and the failure modes of instrumentation, hardware fault tolerance and software considerations.

During this interactive course, participants will learn the key design principles of SIF and the common cause failures; the safety instrumented equipment, SIS logic solvers and field devices in SIF; testing and validating SIF and methods and frequency of testing; the proper documentation and testing and verification best practices for safe commissioning and planning; the execution of proof testing and periodic inspection; the functional safety management and competency in operation and maintenance; the change management, failure reporting and analysis; and the human factors in SIS, auditing and assessing SIS health and measuring and monitoring SIS performance.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on safety instrumented function conceptual
- Discuss safety instrumented systems (SIS) and the importance of SIS in process industries
- Identify the difference between SIS and basic process control systems (BPCS)
- Illustrate safety lifecycle phases and define safety instrumented function (SIF), safety integrity level (SIL) and risk reduction factor
- Carryout hazard identification methods, risk assessment and layers of protection analysis (LOPA)
- Recognize the basic concepts of redundancy and the types of redundant architectures
- Discuss the levels and significance of SIL and apply SIL determination methods and SIL verification
- Identify failure modes of instrumentation, hardware fault tolerance and software considerations
- Identify the key design principles of SIF and avoid common cause failures
- Select safety instrumented equipment and recognize SIS logic solvers and field devices in SIF
- Test and validate SIF, apply methods and frequency of testing and perform proper documentation
- Apply testing and verification best practices for safe commissioning as well as planning and execution of proof testing and periodic inspection
- Employ functional safety management and ensure competency in operation and maintenance
- Carryout change management, failure reporting and analysis and the emerging technologies in SIS
- Recognize the human factors in SIS, audit and assess SIS health and measure and monitor SIS performance

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of safety instrumented function conceptual for instrumentation engineers, control engineers, process engineers and process safety engineers.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Instructor(s)
This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Attalla Ersan, PEng, MSc, BSc, is a **Senior Engineer** with over **35 years** of extensive experience within the **Oil & Gas**, **Hydrocarbon** and **Petrochemical** industries. His expertise widely covers the areas of **Process Analyzer & Analytic Instrumentation**, **Process Control**, Instrumentation, Troubleshooting & Problem Solving, **Process Plant** Operations, **Process Plant** Startup & Operating Procedure, **Control Room** Emergency Response, **SIL Criteria**, Calibration & Configuration of Installed Instrumentation, **PLC & DCS**, **Bearing** Replacement, **Control Valves**, **Emergency Response** Planning, **Boiler & Steam** System Management, **Process Control** Design & Plant Modelling, **Process** Instrumentation & Automation, **Process Control** Instrumentation, **Analyzer Measurement** Systems, **Pressure** Management and Selection & Sizing of all Instrumentation. Further, he is also well-versed in **Permit to Work** System, **Power Transformers**, **Power System** Analysis, **Power Supply** Substations, **Electric Power System** Operation, Fundamentals of **Power System Equipment**, **Power System Stability**, **Power System Harmonics** Analysis, Mitigation & Solution Strategies, **Power System**, Generation & Distribution, **AC & DC Motors**, **Substations, Switchgears & Distribution**, **Electro-mechanical Protection Relays**, Engineering Drawings, Industrial **Power System Coordination**, Distributed Control System (**DCS**), **Honeywell TDS 3000 DCS**, **Liquid** and **Gas Flowmetering**, **Meter** Calibration, Hazard and Operability (**HAZOP**) Study, Process Hazards Analysis (**PHA**), **HAZOP** Facilitation, **Loss Prevention**, Consequence Analysis Application, **Gas Detectors** Operation, **Accident/Incident Investigation** (**Why Tree Method**), **Occupational Exposure** Assessment, **Fire Fighting & First Aid**, **Environmental** Management and Basic **Safety** Awareness. Project Management, Human Resources Consultancy, Manpower Planning, Job Design & Evaluation, Recruitment, Training & Development and Leadership, Creative Problem-Solving Skills, Work Ethic, Job Analysis Evaluation, Training & Development Needs, Bidding & Tendering, Technical Report Writing, Supervisory Leadership, Effective Communication Skills and Total Quality Management (TQM). He is currently the **CEO** of **Ersan Petrokimya Teknoloji Company Limited** wherein he is responsible for the design and operation of Biogas Process Plants.

During his career life, Mr. Ersan has gained his practical and field experience through his various significant positions and dedication as the **Policy**, **Organization & Manpower Development Head**, **Training & Development**, **Head**, **Ethylene Plant – Pyrolysis Furnace Engineer**, **Production Engineer**, Process Training Coordinator, Ethylene Plant Shift Supervisor, Ethylene Plant Panel & Fit Operator, Process Training & Development Coordinator, **Technical Consultant**, and **Instructor/Trainer** for Qatar Vinyl Company Limited and Qatar Petroleum Company (QAPCO).

Mr. Ersan is a **Registered Professional Engineer** and has a **Master's degree** of **Education** in **Educational Training & Leadership** and a **Bachelor's degree** of **Petrochemical Engineering.** Further, he is a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, workshops, conferences and seminars internationally.

Training Methodology
All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Accommodation
Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program
The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Safety Instrumented Systems (SIS)*** *Background and History • Importance of SIS in Process Industries • Difference Between SIS and Basic Process Control Systems (BPCS)*
0930 – 0945	*Break*
0945 – 1030	***Safety Lifecycle Overview*** *Definition and Importance • Safety Lifecycle Phases*
1030 – 1130	***Key Terminologies*** *Safety Instrumented Function (SIF) • Safety Integrity Level (SIL) • Risk Reduction Factor*
1130 – 1215	***Hazards & Risks*** *Hazard Identification Methods • Risk Assessment and its Significance*
1215 – 1230	*Break*
1230 – 1330	***Layers of Protection Analysis (LOPA)*** *Basics of LOPA • Application in Determining SIL Requirements*
1330 – 1420	***Importance of Redundancy*** *Basic Concepts • Types of Redundant Architectures*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***SIL*** *Definition and Importance • Levels and their Significance*
0830 – 0930	***SIL Determination*** *Methods for SIL Determination • Risk Matrix and Risk Graph Methodologies*
0930 – 0945	*Break*
0945 – 1100	***SIL Verification*** *Verifying SIL Meets Requirements • Calculating Probability of Failure on Demand (PFD)*
1100 – 1215	***Failure Modes of Instrumentation*** *Safe Failure and Dangerous Failure • Fail-Safe Concepts*
1215 – 1230	*Break*
1230 – 1330	***Hardware Fault Tolerance*** *Definition and Importance • Common Architectures in SIS (1oo1, 1oo2, 2oo3, etc.)*
1330 – 1420	***Software Considerations in SIS*** *Software Lifecycle • Challenges in Software Design and Validation*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Key Design Principles*** *Simplicity in Design • Avoiding Common Cause Failures*
0830 – 0930	***Selecting Safety Instrumented Equipment*** *Certified versus Prior-Use Equipment • Equipment Lifecycle Considerations*
0930 – 0945	*Break*
0945 – 1100	***SIS Logic Solvers*** *Functionality and Application • Hardware versus Software-Based Solvers*
1100 – 1215	***Field Devices in SIF*** *Sensors and Final Elements • Proper Device Selection Criteria*
1215 – 1230	*Break*
1230 – 1330	***SIF Testing & Validation*** *Importance of Testing and Validation • Methods and Frequency of Testing*
1330 – 1420	***Documentation & Traceability*** *Importance of Proper Documentation • Requirements and Best Practices*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***SIF Commissioning*** *Best Practices for Safe Commissioning • Testing and Verification During Commissioning*
0830 – 0930	***Proof Testing & Periodic Inspection*** *Definition and Importance • Planning and Execution*
0930 – 0945	*Break*

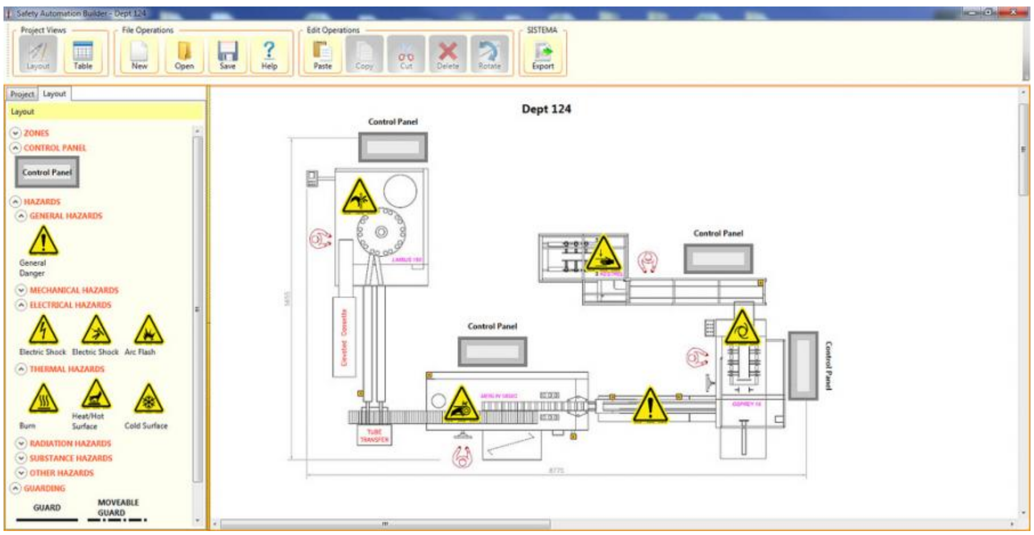
0945 – 1100	***Functional Safety Management*** *Role of Functional Safety Management in SIS • Key Components and Practices*
1100 – 1215	***Training & Competency*** *Importance in SIS Lifecycle • Ensuring Competency in Operation and Maintenance*
1215 – 1230	*Break*
1230 – 1330	***Change Management*** *Importance of Managing Changes • Impact of Changes on SIF and Overall SIS*
1330 – 1420	***Failure Reporting & Analysis*** *Role of Failure Data • Methods for Capturing and Analyzing Failures*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Emerging Technologies in SIS*** *Impact of IIoT and Industry 4.0 on SIS • Cybersecurity in SIS*
0830 – 0930	***Human Factors in SIS*** *Influence of Human Error • Designing with Human Factors in Mind*
0930 – 0945	*Break*
0945 – 1100	***Auditing & Assessment of SIS*** *Role of Audits in Ensuring SIS Health • Key Components of an Effective Audit*
1100 – 1230	***Safety Performance Indicators*** *Measuring and Monitoring SIS Performance • Role in Continuous Improvement*
1230 – 1245	*Break*
1245 – 1345	***Case Studies*** *Real-life Incidents and Lessons Learned • Discussion on How Incidents could have been Prevented*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Safety Automation Builder Software (Rockwell Automation)" simulator.



Safety Automation Builder (Rockwell Automation) Simulator

Course Coordinator

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