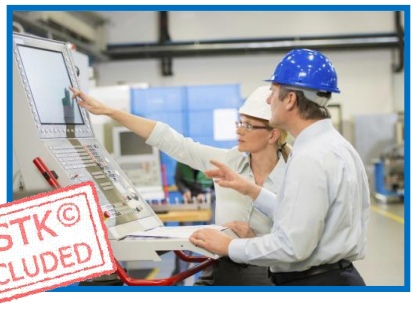
COURSE OVERVIEW IE1146
SIL (System Integrity Level) Certified Inspection Engineer

Course Title
SIL (System Integrity Level) Certified Inspection Engineer



Course Reference
IE1146

Course Duration/Credits
Five days/4.0 CEUs/40 PDHs

Course Date/Venu

Session(s)	Date	Venue
1	July 05-09, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	November 16-20, 2026	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
3	March 21-25, 2027	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	August 23-27, 2027	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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 SIL (System Integrity Level). It covers the functional safety, risk reduction and SIL (safety integrity level); the international standards and compliance and safety instrumented systems (SIS) basics; the hazard identification, risk assessment and SIL determination methods; the SIS design principles, SIL-rated equipment and components and hardware reliability concepts; the probability of failure (PFD & PFH), redundancy and fault tolerance; and the hazardous area considerations and inspection philosophy for SIL systems.

During this interactive course, participants will learn inspection of sensors, logic solvers and final elements, proof testing procedures and E&I inspection for construction and operations; the SIL verification and validation and functional safety assessment (FSA); the non-compliance detection, interpretation, maintenance and lifecycle management; the performance monitoring of SIS, human factors and competency; and the advanced SIL calculations and cybersecurity in SIS.

Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an in-depth knowledge on SIL (system integrity level)
- Discuss functional safety, risk reduction and SIL (safety integrity level)
- Identify the international standards and compliance and safety instrumented systems (SIS) basics
- Apply hazard identification, risk assessment and SIL determination methods
- Recognize SIS design principles, SIL-rated equipment and components and hardware reliability concepts
- Discuss probability of failure (PFD & PFH) and redundancy and fault tolerance
- Illustrate hazardous area considerations and inspection philosophy for SIL systems
- Inspect sensors, logic solvers and final elements as well as apply proof testing procedures and E&I inspection for construction and operations
- Employ SIL verification and validation and functional safety assessment (FSA)
- Apply non-compliance detection and interpretation and maintenance and lifecycle management
- Determine performance monitoring of SIS, human factors and competency
- Carryout advanced SIL calculations and cybersecurity in SIS

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 SIL (System Integrity Level) for instrumentation engineers, process control, process instrumentation and functional safety in process plants and other technical staff.

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.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Course Certificate(s)

(1) Internationally recognized Competency Certificates will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificates

The following are samples of the certificates that will be awarded to course participants:-

(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-25

HTME No. 74851

Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
IE1146	SIL (System Integrity Level) Certified Inspection Engineer	Nov 10-14, 2025	40	4.0

Total No. of CEU's Earned as of TOR Issuance Date **4.0**

TRUE COPY

Jaryl Castillo
Academic Director

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

P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org

Certificate Accreditations

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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 **4.0 CEUs** (Continuing Education Units) or **40 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.

Accommodation

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

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. Barry Pretorius is a **Senior Electrical & Instrumentation Engineer** with almost **30** years of extensive experience within the **Oil**, **Gas**, **Petrochemical**, **Refinery** & **Power** industries. His expertise widely covers in the areas of Distributed Control System (**DCS**), **DCS** Operations & Techniques, **Plant Control** and Protection Systems, **Process Control & Instrumentation**, **Liquid & Gas Flowmetering**, **Custody Measurement**, **Ultrasonic Flowmetering**, **Loss Control**, **Loss Control** & **Multiphase Flowmetering**, **Custody Measurement** & **Loss Control**, **Gas Measurement**, **Cascade Control Loops**, **Split-Range Control Loops**, **Capacity Control** & Other Advanced Control Schemes, **Safety Instrumented Systems**, **Plant Automation** Operations & Maintenance, Programmable Logic Controller (**PLC**), **Siemens PLC** Simatic S7-400/S7-300/S7-200, **PLC & SCADA** for Automation & Process Control, **Artificial Intelligence**, **Allen Bradley PLC** Programing and Hardware Trouble Shooting, Schneider **SCADA System**, **Wonder Ware**, **Emerson**, **Honeywell**, **Honeywell** Safety Manager PLC, **Yokogawa**, Advanced **DCS Yokogawa**, **Endress & Hauser**, Field Commissioning and Start up Testing Pre Operations, **Fire & Gas Detection** System, System Factory Acceptance Test (**FAT**), FactoryLink ECS, Modicon 484, Rockwell Automation, System Site Acceptance Test (**SAT**), **SCADA HMI & PLC** Control Logic, **Cyber Security** Practitioner, **Cyber Security** of Industrial Control System, **IT Cyber Security** Best Practices, **Cybersecurity** Fundamentals, **Ethical Hacking & Penetration Testing**, **Cybersecurity** Risk Management, **Cybersecurity** Threat Intelligence, **OT Whitelisting** for Better Industrial Control System Defense, **NESA** Standard and Compliance Workshop, **OT**, **Cyber Attacks** Awareness - Malware/Ransom Ware / Virus /Trojan/ Philsing, **Information Security Manager**, **Security System** Installation and Maintenance, Implementation, Systems Testing, Commissioning and Startup, **Foxboro DCS & Triconics**, **SIS** Systems, Advanced **DC Drives**, Motion Control, **Hydraulics**, **Pneumatics and Control Systems** Engineering, **Electrical & Automation Control Systems**, **HV/MV Switchgear**, **LV & MV** Switchgears & Circuit Breakers, **High Voltage Electrical Safety**, **LV & HV Electrical System**, **HV Equipment** Inspection & Maintenance, **LV Distribution Switchgear & Equipment**, **Electrical Safety**, **Electrical** Maintenance, **Transformers**, **Medium & High Voltage Equipment**, **Circuit Breakers**, **Cable & Overhead Line** Troubleshooting & Maintenance, **Electrical Drawing & Schematics**, **Voltage Distribution**, **Power Distribution**, **Filters**, **Automation System**, **Electrical Variable Speed Drives**, **Power** Systems, **Power Generation**, **Diesel Generators**, **Power Stations**, Uninterruptible Power Systems (**UPS**), **Battery Chargers**, **AC & DC Transmission**, **CCTV** Installation, **Data & Fire Alarm** System, **Evacuation** Systems and **Electrical Motors & Variable Speed Drives**, & Control of Electrical and Electronic devices.

During Mr. Pretorius's career life, he has gained his practical experience through several significant positions and dedication as the **Technical Director**, **Automation System's Software Manager**, **Site Manager**, **Senior Lead Technical Analyst**, **Project Team Leader**, **Automation Team Leader**, **Automation System's Senior Project Engineer**, **Senior Project & Commissioning Engineer**, **Senior Instrumentation & Control Engineer**, **Electrical Engineer**, **Project Engineer**, **Pre-Operations Startup Engineer**, **PLC Specialist**, **Radio Technician**, **A.T.E Technician** and **Senior Instructor/Trainer** from various companies like the ADNOC Sour Gas, Ras Al Khair Aluminum Smelter, Johnson Matthey Pty. Ltd, Craigcor Engineering, Unitronics South Africa Pty (Ltd), Bridgestone/Firestone South Africa Pty (Ltd) and South African Defense Force.

Mr. Pretorius's has a **Bachelor** of **Technology** in **Electrical Engineering** (**Heavy Current**). Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), received numerous awards from various institutions and delivered numerous trainings, courses, workshops, seminars and conferences internationally.

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 Functional Safety*** *Definition of Functional Safety and Risk Reduction • Difference Between Basic Safety and Functional Safety • Safety Lifecycle Overview • Role of Inspection Engineers in Safety Lifecycle*
0930 – 0945	*Break*
0945 – 1100	***Overview of SIL (Safety Integrity Level)*** *SIL Concept and Risk Reduction Factors • SIL Levels (SIL 1–4) Explained • Demand Modes (Low/High/Continuous) • Real-World SIL Application Examples*
1100 – 1200	***International Standards & Compliance*** *IEC 61508 Framework • IEC 61511 for Process Industry • Relationship with ISO Standards • Regulatory and Certification Requirements*
1200 – 1300	*Lunch*
1300 – 1400	***Safety Instrumented Systems (SIS) Basics*** *SIS Architecture (Sensors, Logic Solver, Final Elements) • Basic SIS Functions • Independence and Redundancy Concepts • Common SIS Configurations*
1400 - 1500	***Hazard Identification & Risk Assessment*** *HAZOP Methodology • LOPA (Layer of Protection Analysis) • Risk Matrices and Tolerability • Identifying Hazardous Scenarios*
1500 – 1515	*Break*
1515 - 1650	***SIL Determination Methods*** *Qualitative versus Quantitative Methods • Risk Graph Approach • LOPA-Based SIL Assignment • Documentation Requirements*
1650 – 1700	***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*
1700	*End of Day One*

Day 2

0730 – 0830	***SIS Design Principles*** *Safety Lifecycle Phases (Design Focus) • Allocation of Safety Functions • Design Constraints and Assumptions • Verification versus Validation*
0930 – 0945	*Break*
0945 – 1100	***SIL-Rated Equipment & Components*** *Sensors (Transmitters, Switches) • Logic Solvers (PLC, Safety PLC) • Final Control Elements (Valves, Actuators) • Certification and Compliance Marking*
1100 – 1200	***Hardware Reliability Concepts*** *Failure Modes (Safe versus Dangerous) • Failure Rates (λ Values) • Diagnostic Coverage • Safe Failure Fraction (SFF)*
1200 - 1300	*Lunch*

1300 – 1400	***Probability of Failure (PFD & PFH)*** *PFDavg Calculation Basics • PFH in Continuous Mode • Impact of Test Intervals • Reliability Block Diagrams*
1400 – 1500	***Redundancy & Fault Tolerance*** *1oo1, 1oo2, 2oo3 Architectures • Hardware Fault Tolerance (HFT) • Voting Logic Systems • Trade-Offs Between Cost and Safety*
1500 – 1515	*Break*
1515 - 1650	***Hazardous Area Considerations*** *Area Classification (Zone 0,1,2) • Explosion Protection Techniques (Ex d, Ex i, Ex e) • SIL versus ATEX/IECEx Relationships • Inspection Requirements in Hazardous Areas*
1650 – 1700	***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*
1700	*End of Day Two*

Day 3

0730 – 0830	***Inspection Philosophy for SIL Systems*** *Purpose of SIL Inspections • Inspection versus Testing versus Verification • Lifecycle Inspection Requirements • Roles and Responsibilities*
0930 – 0945	*Break*
0945 – 1100	***Inspection of Sensors*** *Calibration Requirements • Drift and Accuracy Checks • Installation Compliance • Environmental Impacts*
1100 – 1200	***Inspection of Logic Solvers*** *PLC Configuration Verification • Software Validation Basics • Redundancy Checks • Communication Integrity*
1200 - 1300	*Lunch*
1300 – 1400	***Inspection of Final Elements*** *Valve Stroke Testing • Actuator Functionality • Partial Stroke Testing • Fail-Safe Position Verification*
1400 – 1500	***Proof Testing Procedures*** *Proof Test Intervals • Test Coverage and Effectiveness • Documentation and Records • Common Proof Testing*
1500 – 1515	*Break*
1515 - 1650	***E&I Inspection for Construction & Operations*** *Pre-Commissioning Checks • Loop Checking Procedures • Commissioning Validation • Operational Inspection Routines*
1650 – 1700	***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*
1700	*End of Day Three*

Day 4

0730 – 0830	***SIL Verification & Validation*** *Verification Planning • Validation Procedures • Acceptance Criteria • Documentation Requirements*
0930 – 0945	*Break*

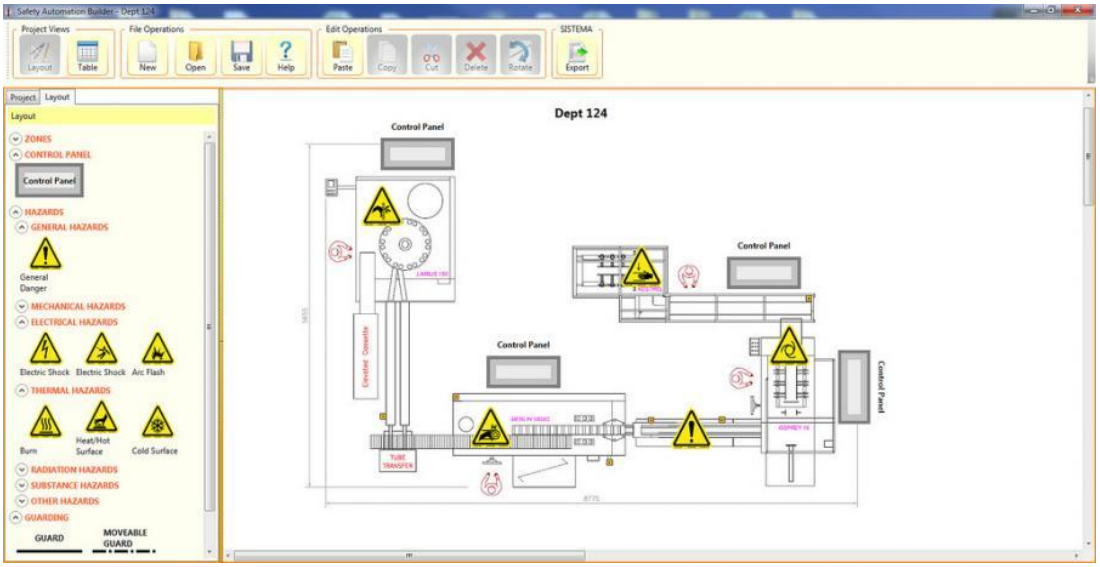
0945 – 1100	***Functional Safety Assessment (FSA)*** *FSA Stages (1–5) • Independent Assessment Requirements • Audit Preparation • Reporting Findings*
1100 – 1200	***Non-Compliance Detection & Interpretation*** *Identifying Deviations • Risk Impact Analysis • Corrective Actions • Reporting Standards*
1200 - 1300	*Lunch*
1300 – 1400	***Maintenance & Lifecycle Management*** *Preventive Maintenance Strategies • Corrective Maintenance • Management of Change (MOC) • Lifecycle Documentation*
1400 – 1500	***Performance Monitoring of SIS*** *KPI Tracking (Failure Rates, Downtime) • Data Collection and Analysis • Reliability Improvement Strategies • Continuous Improvement*
1500 – 1515	*Break*
1515 - 1650	***Human Factors & Competency*** *Operator Interaction with SIS • Human Error Impact • Competency Requirements for Inspectors • Training and Certification Needs*
1650 – 1700	***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*
1700	*End of Day Four*

Day 5

0730 - 0930	***Advanced SIL Calculations*** *Detailed PFD Calculations • Common Cause Failures (CCF) • Beta Factor Model • Software Tools Overview*
0930 – 0945	*Break*
0945 - 1200	***Cybersecurity in SIS*** *Cyber Risks to SIS • IEC 62443 Overview • Secure Architecture Design • Inspection of Cybersecurity Controls*
1200 – 1300	*Lunch*
1300 – 1500	***Case Studies (Industry Applications)*** *Oil & Gas Facilities • Chemical Processing Plants • Power Generation Systems • Incident Analysis and Lessons Learned*
1500 – 1515	*Break*
1515 – 1530	***Practical Inspection Workshop*** *Real Inspection Checklist Development • Field Simulation Exercises • Fault Identification Scenarios • Reporting and Documentation Practice*
1530 – 1545	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1545 – 1645	***COMPETENCY EXAM***
1645 – 1700	*Presentation of Course Certificates*
1700	*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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