

COURSE OVERVIEW IE0179

Understanding OT Network Architecture & Protocols & Implementing Secure OT Network Design Principles

Course Title

Understanding OT Network Architecture and Protocols and Implementing Secure OT Network Design Principles

Course Date/Venue

Session 1: July 06-10, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: December 08-12, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

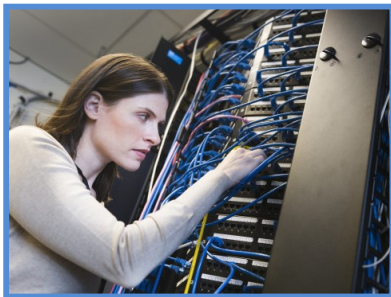
IE0179

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 network and communication protocols. It covers the industrial data communications, data communication basics, smart instrumentation, modern instrumentation and control systems; the basics of digital data communications including OSI model of networking, network topologies, network protocols and network system components; the data communications interface standards, serial data transfer basics and optical cable selection; and the data communications cabling including cables with copper conductors, interference and noise, error detection and correction, copper cable selection, installation recommendations and fiber optic data cables.



Further, this course will also discuss the protocol concepts, ethernet and gigabit ethernet, wireless communication, industrial protocols, master slave configurations and client server configurations; the HART communications protocol, analogue versus digital communications, protocol specifications, cabling, remote diagnostics and calibration; and the ethernet communications protocol including physical, data link, network, transport and applications layer, IP addressing, gigabit ethernet and industrial protocols based on ethernet.

During this interactive course, participants will learn the FOUNDATION fieldbus, open platform communications protocol (OPC), devicenet protocol, PROFIBUS protocol, modbus protocol and controlnet protocol; the wireless LAN in industrial networks (IWLANS); the fundamentals of wireless technology, WLAN access procedures and comparison and coexistence of different wireless technologies; planning and configuring of different radio links; securing high data rates in IWLANS; and the industrial network systems security covering security attacks, security measures and security policy.

Course Objectives

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

- Apply and gain an in-depth knowledge on network and communication protocols
- Discuss industrial data communications, data communication basics, smart instrumentation, modern instrumentation and control systems
- Review the basics of digital data communications including OSI model of networking, network topologies, network protocols and network system components
- Recognize data communications interface standards, serial data transfer basics and optical cable selection
- Describe data communications cabling including cables with copper conductors, interference and noise, error detection and correction, copper cable selection, installation recommendations and fiber optic data cables
- Discuss the protocol concepts, ethernet and gigabit ethernet, wireless communication, industrial protocols, master slave configurations and client server configurations
- Explain HART communications protocol, analogue versus digital communications, protocol specifications, cabling, remote diagnostics and calibration
- Describe the ethernet communications protocol including physical, data link, network, transport and applications layer, IP addressing, gigabit ethernet and industrial protocols based on ethernet
- Identify FOUNDATION fieldbus, open platform communications protocol (OPC), devicenet protocol, PROFIBUS protocol, modbus protocol and controlnet protocol
- Illustrate wireless LAN in industrial networks (IWLANS) and discuss the fundamentals of wireless technology, WLAN access procedures and comparison and coexistence of different wireless technologies
- Plan and configure different radio links and secure high data rates in IWLANS
- Employ industrial network systems security covering security attacks, security measures and security policy

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 a basic overview of all significant aspects and considerations of network and communication protocols for operators and technicians.

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.

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 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: -

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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.
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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 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:



Dr. Abedallah Al-Oqaili, PhD, MSc, is a **Senior IT Engineer** with over **30 years** of teaching and industrial experience in the areas of **MS Excel, MS WinWord, MS PowerPoint, ERP SAP 6.0, Artificial Intelligence & Neural Network, Cyber Ethical Hacking, Windows Operating System, Windows Server Administration, Python Programming, MS Office 365 BI, Digital Strategy & Transformation, Data Base Design, Computer Maintenance, System Analysis & Design, SQL Programming, Decision Support Systems & Business Intelligence, SQL, PL/SQL, C, C++, Java, Computer Applications, Scripting Languages, VB, VB.Net, Simulation & Modelling, Management Information Systems, E-commerce, Oracle HRMS, Oracle Forms & Reports, Oracle PL/SQL, Problem Solving Technique, Oracle ERP, ERP Customized Oracle Application, Organization & System Process, User Acceptance Testing (UAT), Core HR, Payroll, SSHR, OLM, IRec, Medical, RTA & Provident Fund, Oracle Developer/2000, Oracle 7.3 & Oracle 8i System, Oracle & FoxPro for Windows, DBASE III+, Clipper, FoxPro 2.1, JDeveloper: Building Applications with ADF, Oracle Developer, Oracle WebDB, J2EE (Java 2 Enterprise Edition), Java Programming, Oracle Payroll Fast Formula, Oracle: Internet Application I, Oracle 8i DBA, Oracle 8i Forms 1&2, Oracle 8i Report, Oracle Application Server Rel. 4.0, Oracle DBA, Building Web Sites on the Internet, Visual Basic 5, Oracle7 SQL, Oracle Reports V2.5, Oracle Forms V4.5/V5.0/V6.0/V6i, Oracle Server Administrations, Software Systems Analysis & Design, General Orientation Course at ATOS, Application Engineering (PC Based System Design & Development), Novell 3.11, Novell NetWare, Lotus 123, Excel and Word Processing. Further, he is also well-versed in Project Management, Project Analysis, Design and Development for Mail Revenue & Handling System, Leadership Training, Manager Skills, Supervisory Skills, Microsoft Project, Advanced Excel, Instructional Techniques, Oracle Mobile Development Framework and Technical Writing.**

During his career life, Dr. Abedallah has gained his technical and practical expertise through a variety of challenging and key positions such as the IT **Senior Manager, IT Manager, IT Project Manager, IT Trainer, Management Information System Faculty Head, Computer Science College Professor, Computer and Business Networking Department Trainer, IT Superintendent, IT Software Supervisor, IT System Analyst and IT Programmer** for various international companies such as the PAAET Basic Education College, Philadelphia University, Royal Jordan Airlines and Abu Al-Haj Training Center.

Dr. Abedallah has a **PhD in Computer Information Systems** and a **Master's degree in Information System** from the **University of Banking and Financial Sciences, Computer Information Systems**. Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management (ILM)**, a **Certified Systems Engineer & Systems Administrator (Security, Microsoft Office Specialist and Microsoft Certified IT Professional)** and has delivered numerous trainings, conferences and workshops worldwide.

Dr. Hesham Abdou, PhD, MSc, BSc, is a **Senior Drilling & Petroleum Engineer** with over **35 years** of integrated industrial and academic experience as a **University Professor**. His specialization widely covers in the areas of **Drilling & Completion Technology, Directional Drilling, Horizontal & Sidetracking, Drilling Operation Management, Drilling & Production Equipment, ERD Drilling & Stuck Pipe Prevention, Natural & Artificial Flow Well Completion, Well Testing Procedures & Evaluation, Well Performance, Coiled Tubing Technology, Oil Recovery Methods Enhancement, Well Integrity Management, Well Casing & Cementing, Acid Gas Removal, Heavy Oil Production & Treatment Techniques, Crude Oil Testing & Water Analysis, Crude Oil & Water Sampling Procedures, Equipment Handling Procedures, Crude & Vacuum Process Technology, Gas Conditioning & Processing, Cooling Towers Operation & Troubleshooting, Sucker Rod Pumping, ESP & Gas Lift, PCP & Jet Pump, Pigging Operations, Electric Submersible Pumps (ESP), Progressive Cavity Pumps (PCP), Water Flooding, Water Lift Pumps Troubleshooting, Water System Design & Installation, Water Networks Design Procedures, Water Pumping Process, Pipelines, Pumps, Turbines, Heat Exchangers, Separators, Heaters, Compressors, Storage Tanks, Valves Selection, Compressors, Tank & Tank Farms Operations & Performance, Oil & Gas Transportation, Oil & Gas Production Strategies, Artificial Lift Methods, Piping & Pumping Operations, Oil & Water Source Wells Restoration, Pump Performance Monitoring, Rotor Bearing Modelling, Hydraulic Repairs & Cylinders, Root Cause Analysis, Vibration & Condition Monitoring, Piping Stress Analysis, Amine Gas Sweetening & Sulfur Recovery, Heat & Mass Transfer and Fluid Mechanics.**

During his career life, Dr. Hesham held significant positions and dedication as the **General Manager, Petroleum Engineering Assistant General Manager, Workover Assistant General Manager, Workover Department Manager, Artificial Section Head, Oil & Gas Production Engineer and Senior Instructor/Lecturer** from various companies and universities such as the Cairo University, Helwan University, British University in Egypt, Banha University and Agiba Petroleum Company.

Dr. Hesham has a **PhD and Master degree in Mechanical Power Engineering** and a **Bachelor degree in Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Peer Reviewer**. Dr. Hesham is a member of Egyptian Engineering Syndicate and the Society of Petroleum Engineering. Moreover, he has published technical papers and journals and has delivered numerous trainings, workshops, courses, 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 course 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	Overview of Industrial Data Communications Data Communications Basics • Brief Overview of “Smart” Instrumentation • Overview of Modern Instrumentation & Control Systems
0930 – 0945	Break
0945 – 1030	Basics of Digital Data Communications OSI Model of Networking • Network Topologies • Network Protocols • Networking System Components
1030 - 1230	Data Communications Interface Standards Serial Data Transfer Basics • RS-232 Interface Standard • RS-422 Interface Standard • RS-423 Interface Standard
1230 - 1245	Break
1245 – 1420	Data Communications Interface Standards (cont’d) RS-485 Interface Standard • The Optical Data Interface Standards • Optical Cable Selection
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 – 0930	Data Communications Cabling Cables with Copper Conductors • Interference & Noise • Error Detection & Correction • Copper Cable Selection & Installation Recommendations • Fibre Optic Data Cables • Optical Cable Selection
0930 – 0945	Break
0945 – 1100	Introduction to Protocols Protocol Concepts • Ethernet & Gigabit Ethernet • Wireless Communication Protocols • Industrial Protocols • Master Slave Configurations • Client Server Configurations
1100 – 1230	Hart Communications Protocol What is HART • Analogue vs. Digital Communications • Protocol Specifications • Cabling • HART Signaling • HART Command Set
1230 – 1245	Break
1245 – 1420	Hart Communications Protocol (cont’d) HART Device Description Language (DDL) • Remote Diagnostics & Calibration • WirelessHART • HART-Compatible Field Devices
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 – 0930	Ethernet Communications Protocol What is Ethernet? • Physical Layer • Data Link Layer • The Network Layer • Transport Layer • Applications Layer • Cabling • IP Addressing • Gigabit Ethernet • Industrial Protocols Based on Ethernet
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0930 – 0945	Break
0945 – 1100	FOUNDATION Fieldbus What is Fieldbus? • Fieldbus Components • Fieldbus Components • Cabling • Device Identification • Cabling • Client&Server Interaction • FOUNDATION Fieldbus H1 • FOUNDATION Fieldbus HSE
1100 – 1230	Open Platform Communications Protocol (OPC) What is OPC? • OPC Fundamentals • OPC in the Plant
1230 – 1245	Break
1245 – 1420	Open Platform Communications Protocol (OPC) (cont'd) Data Access Types • OPC Servers • Classic OPC & OPC UA
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

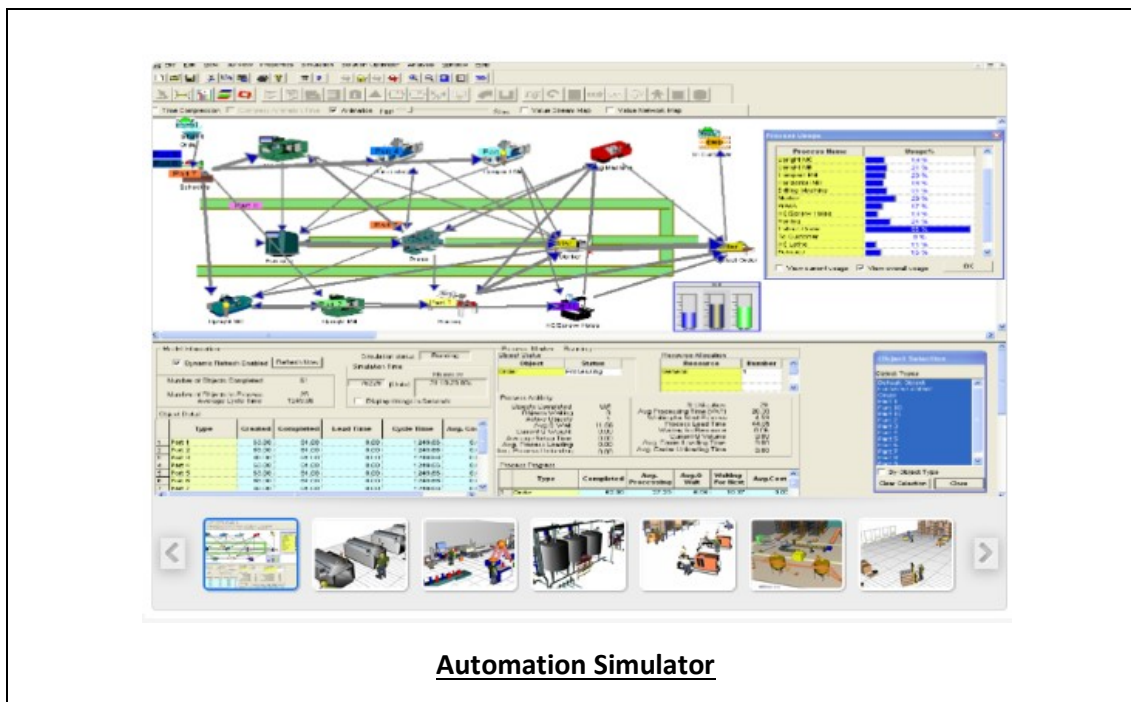
0730 – 0930	DeviceNet Protocol What is DeviceNet? • DeviceNet Fundamentals • DeviceNet Cabling • Component Identification • Physical & Logical Data Transfer • DeviceNet over a Controller Area Network (CAN) • CANopen Structure
0930 – 0945	Break
0945 – 1100	PROFIBUS Protocol What is Profibus? • PROFIBUS Fundamentals • PROFIBUS Cabling • Master & Slave Interaction • Multi-Master Systems • PROFIBUS PA • PROFIBUS DP • PROFINET
1100 – 1230	Modbus Protocol What is Modbus? • Modbus Fundamentals • Modbus Cabling • Modbus Message Frame Formats
1230 – 1245	Break
1245 – 1420	Modbus Protocol (cont'd) Modbus RTU • Modbus ASCII • Modbus TCP
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0830	ControlNet Protocol What is ControlNet? • ControlNet Fundamentals • ControlNet Cabling • ControlNet Components • ControlNet Network Packet Format
0830 – 0930	Wireless LAN in Industrial Networks (IWLANS) Fundamentals of Wireless Technology • WLAN Access Procedures • Comparison & Coexistence of Different Wireless Technologies • Planning & Configuration of Different Radio Links • Security & High Data Rates in IWLANS
0930 – 0945	Break
0945 – 1230	Industrial Network Systems Security Attacks • Security Measures • Security Policy
1230 – 1245	Break
1245 – 1345	Industrial Network Systems Security (cont'd) Security Policy
1345 – 1400	Course Conclusion
1400 – 1415	POST-TEST
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulators (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 one of our state-of-the-art simulator “Automation Simulator”.



Course Coordinator

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