COURSE OVERVIEW IE0008
Certified Fiber Optics Technology & Access Network Planning

Course Title
Certified Fiber Optics Technology & Access Network Planning



Course Date/Venue
Session 1: March 21-25, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar
Session 2: August 01-05, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar

Course Reference
IE0008

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

Course Description







This practical and highly-interactive course includes practical sessions and exercises where participants carryout fiber optic splicing, testing and troubleshooting. Theory learnt in the class will be applied using a state-of-the-art fiber optics technology and equipment suitable for in-class training.

The rapidly changing face of data communications and telecommunications has seen a continued growth in the need to transfer enormous amounts of information across large distances. The technologies that were used extensively in the past such as coaxial cable, satellite and microwave radio for transferring information were running out of capacity. With the fiber optic communication systems, the solution to the problems of transmission capacity shortage and to noisy industrial environments has been successfully found.

The course is designed to provide delegates with a detailed and up-to-date overview on the fiber optics technology in general and the fiber optics access network planning in particular. Participants will be provided with knowledge and skills to analyze optical fiber cables problems and adjust the splicing and termination of the optical fiber cables; employ optical fiber systems configurations and calculations; identify its components; evaluate optical fiber networks working in SDH; and follow the errors of the SDH networks.

The course will also cover the SDH fundamentals graphical; SDH fundamentals revision; SDH & PHD comparison; SDH overview; network topology structures, protection classification, directional and fiber protection; SDH networks problems and its solutions; SDH networks graphical and WDM.

Course Objectives/Outcomes & Benefits for the Participants

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

- Get certified as a "*Certified Fiber Optics Professional (CFOP)*"
- Apply state of the art fiber optics technology, installation practices and access network planning
- Specify and describe fiber optic communications systems in total
- Gain **practical hands-on experience** in jointing, splicing and testing fiber optic systems and use correct procedures for cable installation and termination
- Recognize fiber optic termination patch panels and identify the various types of adapters and its merits/demerits
- Design and install a fully operational fiber optics system
- Implement the latest approaches in troubleshooting fiber optics
- Discuss communication basics covering analog and digital signals, standard voice channel, pulse code modulation, sampling, bit rate, band width, PDH and standard E1 frame
- Explain SDH standards, SDH multiplexing principle, SDH frame and SDH network elements
- Describe SDH hierarchy, SDH frame details and transport modules
- Differentiate the SDH fundamentals graphical, SDH fundamentals revision, SDH & PHD comparison and SDH overview
- Illustrate network topology structures, protection classification and directional & fiber protection
- Recognize SDH networks revision, problems and its solutions
- Identify the SDH networks graphical introduction and WDM

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 covers systematic techniques and methodologies on fiber optics technology in general and the fiber optics access network planning in particular. It is suitable for communications and IT engineers and other engineers and technical staff who are working with optical fiber and SDH networks and who are involved in fiber optics including instrumentation, control, electronics and electrical.

Course Certificate(s)

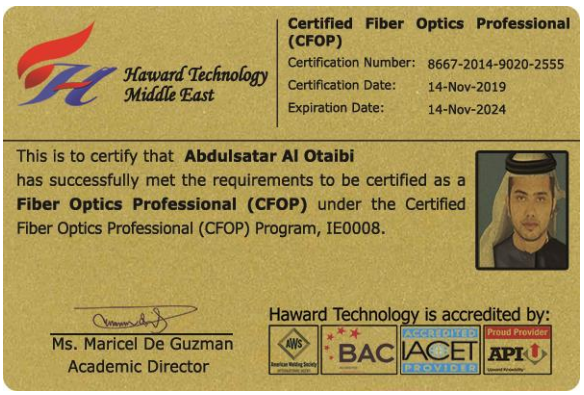
(1) Internationally recognized Competency Certificates and Plastic Wallet Card Certificates will be issued to participants who have successfully completed the course and passed the exam at the end of the course. Successful candidate will be certified as a "*Certified Fiber Optics Professional (CFOP)*". 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

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Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-19

HTME No. 8667-2014-9020-2555

Participant Name: Abdulsatar Al Otaibi

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
IE0008	Certified Fiber Optics Technology & Access Network Planning	November 10-14, 2019	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized 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 1-2013 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 1-2013 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 | Fax: +971 2 3091 716 | 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 **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.

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. John Vorster, MSc, BTech, is a **Senior Instrumentation**, **Control & Energy Engineer** with over **25 years** of industrial experience within the **Oil**, **Gas**, **Process**, **Refinery**, **Power** and **Nuclear** industries. His wide expertise includes Programmable Logic Controller (**PLC**), **Process Control** Design & Plant Modelling, **Instrumentation**, **Automation**, **Process Control** Instrumentation, **Process Control**, **SCADA** System, Introduction to **SCADA**, **PLC & SCADA** for Automation & Process Control, Distributed Control System (**DCS**), **Instrumentation & Safeguarding**, **Process Control Measurement**, **Pressure** Measurements, **Temperature** Measurements, **Level** Measurement, **Flow** Measurement, **Control Valves & Actuators**, **Energy Management** System Awareness, **Renewable Energy**, **Energy** Conservation & Technologies, **Utility Systems**, **Nuclear** Energy, **Distributed Energy Systems**, **Natural Gas Distribution**, **Field Indication Instruments**, **P&ID** & Technical Specification, **Test Equipment Calibration**, **Field Bus** & **Field Communications**, Testing, Calibration & Maintenance of **Flow**, **Level**, **Pressure & Temperature**, **Loss Control** & **Multiphase Flowmetering**, **Custody Measurement** & **Loss Control**, **Flow Measurement** & **Custody Measurement**, **Flow Computer**, **Turbine Flowmeters**, **Ultrasonic Flowmeter**, **Positive Displacement Flowmeter**, **Coriolis Flowmeter**, **Flow Rate Corrections**, **Pressure Flow Transmitters**, **Pressure Methods**, **Flow Nozzles**, **Orifice Plates**, **Venturi Tubes**, **Pitot Tubes**, **Analyzer** Measurement Systems, **Pressure** Management, Selection & Sizing of all Instrumentation, **SIL** Criteria, Calibration & Configuration of Installed Instrumentation, **Bearing Replacement** and **Control Valves**. Further, he is also well-versed in HAZOP, LOPA Studies, Radiation Protection, Hazardous Substances, Hazardous Area Classification, Nuclear Devices Maintenance, Loop Drawings, Loop Calculations, Engineering Drawings, Shutdown Maintenance & Planning, Asset Management, Six Sigma, Energy Management & Measurements, Project Management, Strategic Resource Planning, Budget Preparation, ISO 9001, ISO 14000 and ISO 18000 standards. He is currently the **Instrumentation Analyzer & Engineer** of **Sasolburg** wherein he is in-charge of the design and monitoring of the analyzer measurement systems.

During his career life, Mr. Vorster has gained his practical and field experience through his various significant positions and dedication as the **Project Manager**, **Senior Trainer/Instructor**, **Senior Instrumentation Engineer**, **Instrumentation Engineer**, **Green Belt Project Leader**, **Instrumentation Technologist**, **Senior Instrumentation/Electrical Artisan**, **Instrumentation Artisan** and **Apprentice Instrumentation** for numerous international companies including **Sasolburg**, **DOW Chemical Company**, **Safripol** and **Iscor**.

Mr. Vorster has a **Master's** degree in **Engineering Development & Management**, as well as a **Bachelor's of Technology** degree and a **National Diploma** in **Electrical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), an **Appointed Radiation Protection Officer** and a **Qualified Instrument Mechanician**. Moreover, he is an active member of Project Management Institution (**PMI**) and South African Institute of Measure and Control (**SAIMC**) and has delivered numerous courses, workshops, conferences and seminars internationally.

Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

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 Fee

US$ 6,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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 and Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction to Fiber Optics Systems*** *Introduction • Outline of Course • Historical Background to Fiber Optic • Comparison of Fiber Optics and Copper Systems • Data Communications • Communications Channels • Transmission Modes • The Electromagnetic Spectrum • Revisiting Copper*
0900 – 0930	***Theory of Fiber Optics Transmission*** *Fundamental Principals of Operation • Light Transmission Nature of Glass • Numerical Aperture • Modal Propagation in Fibers • Multimode/Single Mode/StepIndex/Graded Index*
0930 – 0945	*Break*
0945 – 1100	***Theory of Fiber Optics Transmission (cont'd)*** *Bandwidth of Fibers • Modal and Chromatic Dispersion • Absorption/Scatter/Bending/Radiation/Mismatches • Other Types of Fibers*

1100 – 1215	***Construction of Fiber Optic Cables*** *Cable Objectives • Tensile Ratings • Structural Elements • Housings – Loose Tube/Slotted Core/Tight Buffered • Sheaths and Moisture Barriers • Classes of Cables – Aerial/Underground/Sub Aqueous/Indoor*
1215 – 1230	*Break*
1230 – 1330	***Connecting Fibers*** *Optical Connection Issues • Fiber End Preparation • Splicing Fibers – Fusion/Mechanical • Connectors • Optical Couplers*
1330 – 1420	***Practical Session #1 - Optical Connectors*** *Each Delegate to Fit One ST & One SC Connector to a Cable and Inspect the Connectors*
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	***Practical Session #2- Fusion Splicing*** *Each Student to Make a Fusion Splice in their Cable*
0830 – 0930	***Optical Drivers and Detectors*** *Light Emitting Diodes • Lasers • Transmitters Modules • Safety Considerations• PIN Photodiodes • Receiver Modules • Optical Amplifiers*
0930 – 0945	*Break*
0945 – 1100	***Fiber Optic Termination Patch Panels*** *Compact Fiber Optic Patch Panel • Wall Mounted Optical Fiber Patch Panels • Rack Mounted Optical Fiber Termination Panel • Splice Trays • Terminal Blocks & Patch Panels • Enclosures, Racks & Equipment Housings • Faceplate Slide-Out Mechanism*
1100 – 1215	***Types of Adapters & its Merits/Demerits*** *Optical Fiber Connectors – Duplex 568SC Adapter • Optical Fiber Connectors – simplex ST - ST Adapter • Other Fiber Optic Adapters*
1215 – 1230	*Break*
1230 – 1330	***Installing Fiber Optic Cables*** *Initial Preparation – Site Survey/Design • General Installation Rules and Procedures • Bending Radius/Cable Tension/Cable Reels • Cable Trays/Conduits/Lubricants •Indoor Cable Installation/Leaving Extra Cable • Outdoor Cable Installation/Environmental Conditions • Splicing Trays / Organizers /Termination Cabinets/Patch Panels / Distribution Panels / Breakout Boxes*
1330 – 1420	***Fiber Optics System Design*** *Initial Design Considerations • Future Capacity/Reliability/Operation Wavelength • Repeaters and Amplifiers • Design Loss Calculations/Link Loss Budgets • Design Bandwidth Calculations*
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	***Testing of Fiber Optic Systems*** *Concepts of Optical Measurement • Continuity Testing • Insertion Loss Testing • Optical Time Domain Reflectometry (OTDR) • Bit Error Rate (BER) Testing • Eye Diagrams • Laboratory Fiber Tests*
0830 – 0930	***Practical Session #3- Insertion Loss Testing*** *Students to Measure the Insertion Loss of their Cable*
0930 – 0945	*Break*
0945 – 1100	***Communication Basics*** *Analog and Digital Signals ● Standard Voice Channel ● Pulse Code Modulation ● Sampling ● Bit Rate ● Band Width ● PDH ● Standard E1 Frame*
1100 – 1215	***SDH*** *SDH Standards ● SDH Multiplexing Principle ● SDH Frame ● SDH Network Elements*
1215 – 1230	*Break*
1230 – 1420	***SDH Hierarchy*** *SDH Hierarchy Details ● Frame Components*
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	***SDH Frame Details & Transport Modules*** *Path Overheads ● Section Overheads ● STM-1 ● STM-n*
0830 – 0930	***SDH Fundamentals Graphical***
0930 – 0945	*Break*
0945 – 1100	***SDH Fundamentals Revision***
1100 – 1215	***SDH & PDH Comparison & SDH Overview***
1215 – 1230	*Break*
1230 – 1420	***Network Topology Structures*** *Classification of Topology Structures (Chain, Star, Tree, Ring & Mesh) ● Sub Network ● Survival Networks*
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	***Protection Classification*** *Linear Protection ● Protection Rings ● PP Ring ● MSP Ring ● SNCP*
0830 – 0930	***Directional & Fiber Protection*** *Unidirectional and Bidirectional Rings ● 2 & 4 Fibers Protection Rings*
0930 – 0945	*Break*
0945 – 1100	***SDH Networks Revision, SDH Networks Problems and Its Solutions***
1100 – 1215	***SDH Networks Graphical***
1215 – 1230	*Break*
1230 – 1300	***WDM***

1300 – 1315	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



FSM-50S PROFILE ALIGNMENT FUSION SPLICER

Features & Capabilities:

- Fully automatic core alignment with 9 second splice time for SM fibre
- Reduced splice protector shrink time – now only 35 seconds
- Extremely compact & lightweight – just 2.8kg
- Automatic fibre-type identification
- Multi-position monitor for front or top mounting
- Real-time arc calibration
- Fibre clamps integrated into wind protector to reduce operation time





OptiFiber® OTDR

Features & Capabilities:

- Integrates power/loss, fiber length measurement, OTDR analysis and fiber connector end-face imaging
- allows network owners of any experience level to certify fiber to industry specifications and standards, troubleshoot links, and thoroughly document results
- makes dual wavelength OTDR measurements - 850/1300 nm or 1310/1550 nm
- identifies and characterizes the fiber link and its events
- compares the results to user-defined limits for immediate pass/fail link and event certification



Course Coordinator

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