COURSE OVERVIEW IE0010
Certified Fiber Optics Professional (CFOP)
Practical Fiber-Optics Technology

Course Title
Certified Fiber Optics Professional (CFOP): Practical Fiber-Optics Technology

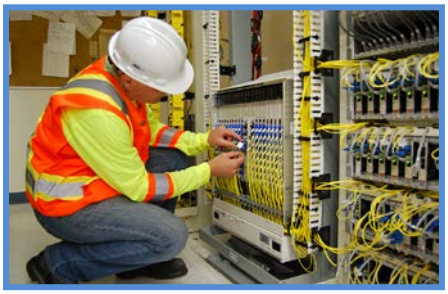
Course Reference
IE0010

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

Course Date/Venue

Session(s)	Dates	Venue
1	January 21-25, 2024	Boardroom, Warwick Hotel Doha, Doha, Qatar
2	April 22-26, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
3	July 07-11, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
4	October 13-17, 2024	Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

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 our state-of-the-art equipment.

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 introduction of fiber optic communications systems, the solution to the problems of transmission capacity shortage and to noisy industrial environments has been successfully found.

Fiber optic transmission has become one of the most exciting and rapidly changing fields in telecommunications engineering. An optical fiber is simply a very thin piece of glass which acts as a pipe, through which light can pass. The light that is passed down the glass fiber can be turned on and off to represent digital information or it can be gradually changed in amplitude, frequency or phase to represent analog information.

Fiber optic transmission systems have many advantages over more conventional transmission systems. They are less affected by noise, do not conduct electricity and therefore provide electrical isolation, carry extremely high data transmission rates and carry data over very long distances. These and other advantages will be discussed in detail in this course.

Fiber optic transmission systems are not perfect and there are difficulties involved in designing, implementing, and operating fiber optic communications systems. This course is designed to provide a thorough background to fiber optic communications systems and to illustrate the design and installation of these systems. The many pitfalls associated with the implementation of fiber optic systems will be discussed and workable solutions to these problems will be provided in this course.

This course will provide an extensive overview of the construction, operation and applications of optical fiber, with more emphasis on installation and troubleshooting. The course will give both the novice and the experienced participant a solid grasp of the principles and practical implementation of fiber optic cabling for industrial applications.

Course Objectives

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 and installation practices
- 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
- Convert UTP ethernet to fiber optics and specify media converters
- Design and install a fully operational fiber optics system
- Implement the latest approaches in troubleshooting fiber optics

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 fiber optics technology for engineers and other technical staff within instrumentation, control, communications, telecommunications, electrical and IT fields. This includes project, maintenance and consulting staff, systems and applications engineers.

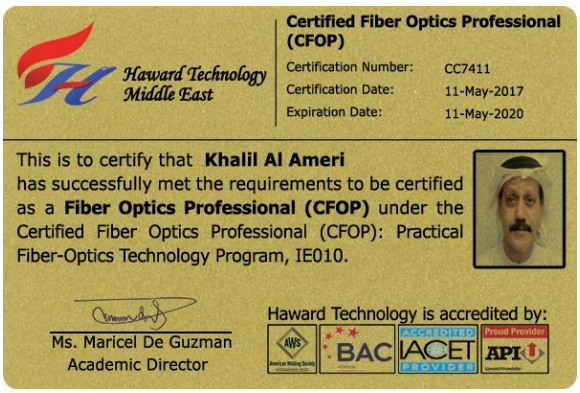
Course Certificate(s)

(1) Internationally recognized Wall Competency Certificates and Plastic Wallet Card 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. Successful candidate will be certified as a "*Certified Fiber Optics Professional (CFOP)*". Certificates are valid for 5 years.

Recertification Fee is a 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.

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Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 11-May-17

HTME No. PAR11317

Participant Name: Khalil Al Ameri

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
IE010	**Certified Fiber Optics Professional (CFOP): Practical Fiber-Optics Technology**	May 07-11, 2017	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), 1760 Old Meadow Road, Suite 500, McLean, VA 22102, 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

Certificates are accredited by the following international accreditation organizations: -

- 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.

- 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.

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:

Professor Mike Kanova is a **Senior Electrical** & **Instrumentation Engineer** with **over 30 years** of industrial experience. His expertise extends widely over the areas of National Electrical Code (**NEC**), National Electrical Safety Code (**NESC**), **Security Systems Installation & Maintenance**, **Security Management**, **Protection Relay**, **Power Generation**, **Generator Excitation Systems**, **Circuit Breakers & Switchgears**, **Power Systems Control & Stability**, **Electrical Fault Analysis**, **Electric Distribution System Equipment**, **Electric Power System**, **Motors and VSDs** as well as **Gas Turbine**, **Flowmeter Technology**, **Industrial & Power Electronics**, **Process Control** & **Instrumentation**, **Fieldbus**, **Process Automation**, **Manufacturing Automation**, **High Speed Ethernet Network**, **HART**, **Digital Communication Networks**, **Power Factor Protection Technology**, **Electrical Control Systems**, **SIL**, **SIS**, **ESD**, **Distributed Control Systems** (**DCS**) and **Fibre Optics Technology**. Further, his experience has proven him well in the practice and has given him the chance to work with **international organizations** such as the **Instrument Society of America** (**ISA**), the **Institute of Measurements and Control**, the **United Nations Educational Scientific and Cultural Organization** (**UNESCO**) and the **International Electrical Testing Association** (**NETA**).

During Professor Kanova's career life, he gained extensive experience in the electrical, instrumentation and control systems engineering field through various challenging **engineering** & **managerial** positions that he filled while working as the **Scientist/Inventor**, **Project Manager**, **Development Engineer**, **Electronics Engineer**, **Stream Leader**, **Co-leader**, **Supervisor**, **Researcher**, **Conference Organizer**, **External Examiner**, **Lecturer** in Electronics, Opto-electronics and Power Electronics, **Course Developer**, **Organizing & Editorial Committee Member**, Part-time **Consultant** and Part-time **Lecturer** from the **Cape Peninsula University of Technology**, **University of Cape Town**, **University of Western, University of Johannesburg Witwatersrand**, **Walter Sisulu University**, **ESKOM**, NRF, SCINAC Tokai, Plessey Southern Africa Retreat, **Peninsula Technikon**, SA Nylon Spinners and R&B Electronics Rondebosch.

With the knowledge and skills he gained herein, he has produced **over 100 publications** and **papers** that were presented to numerous gatherings like the **International Conference on System Modelling & Control**; **International Conference on Industrial and Commercial Use of Energy**; **International Conference of Control Signals and Systems**; the **UICEE Annual Conference on Engineering Education**, the **ETMSA** (**Energy Technology Modelling**, **Simulation and Applications**), the **Symposium on Energy Technology**, **Modelling**, **Simulation & Applications**. Those papers were also published in journals such as the **NETA Journal**; the **IEEE Aerospace and Electronic Systems Journal**; the **International Journal of Power and Energy Systems**; the **Journal of the Electricity Supply Industry**; the **International Journal of Computers and Applications**; the **Journal of the Electronics Technology** and the **Quantum Journal**.

Professor Kanova is a **Registered Professional Engineer** and has a **PhD**, **Master** and **Bachelor** degrees in **Electrical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/ Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**) and a well-respected member of the **IEEE** and is actively engaged with numerous projects in affiliation with the **Society for Photo-optical Instrumentation** Engineers (**SPIE**), the **Aerospace and Electronic Systems Society** (**AESS-IEEE**), the **Circuits and Systems Society** (**CSS-IEEE**), the **Lasers and Electro-optics Society** (**LES-IEEE**) and the **Power Electronic Society** (**PELS-IEEE**).

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

Doha	**US$ 6,500** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	**US$ 6,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 6,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**US$ 6,000** 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 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 – 0930	***Introduction to Fiber Optics Systems*** *Introduction • Outline of Course • Historical Background to Fiber Optic • Comparison of Fiber Optics and Copper Systems*
0930 – 0945	*Break*
0945 – 1100	***Definitions, Basic Principles*** *Data Communications • Communications Channels • Transmission Modes*

1100 – 1230	***Definitions, Basic Principles (cont'd)*** *The Electromagnetic Spectrum • Revisiting Copper*
1230 – 1245	*Break*
1245 – 1420	***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*
1420 - 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Theory of Fiber Optics Transmission (cont'd)*** *Bandwidth of Fibers • Modal and Chromatic Dispersion • Absorption/Scatter/Bending/Radiation/Mismatches • Other Types of Fibers*
0930 – 0945	*Break*
0945 – 1100	***Construction of Fiber Optic Cables*** *Cable Objectives • Tensile Ratings • Structural Elements • Housings – Loose Tube/Slotted Core/Tight Buffered*
1100 - 1230	***Construction of Fiber Optic Cables (cont'd)*** *Sheaths and Moisture Barriers • Classes of Cables – Aerial/Underground/Sub Aqueous/Indoor*
1230 – 1245	*Break*
1300 – 1420	***Connecting Fibers*** *Optical Connection Issues • Fiber End Preparation • Splicing Fibers – Fusion/Mechanical • Connectors • Optical Couplers*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Practical Session #1 - Optical Connectors*** *Each Delegate to Fit One ST & One SC Connector to a Cable and Inspect the Connectors*
0830 – 0930	***Practical Session #2- Fusion Splicing*** *Each Student to Make a Fusion Splice in their Cable*
0930 – 0945	*Break*
0945 – 1230	***Optical Drivers and Detectors*** *Light Emitting Diodes • Lasers • Transmitters Modules • Safety Considerations• PIN Photodiodes • Receiver Modules • Optical Amplifiers*
1230 – 1245	*Break*

1245 – 1345	***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*
1345 – 1420	***Types of Adapters & its Merits/Demerits*** *Optical Fiber Connectors – Duplex 568SC Adapter • Optical Fiber Connectors – simplex ST - ST Adapter • Other Fiber Optic Adapters*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 - 0930	***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*
0930 – 0945	*Break*
0945 – 1100	***Fiber Optics System Design*** *Initial Design Considerations • Future Capacity/Reliability/Operation Wavelength • Repeaters and Amplifiers • Design Loss Calculations/Link Loss Budgets • Design Bandwidth Calculations*
1100 - 1230	***Media Converters*** *Convert UTP Ethernet to Fiber Optics • Specifications for the Media Converters*
1230 – 1245	*Break*
1245 – 1420	***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*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Practical Session #3- Insertion Loss Testing*** *Students to Measure the Insertion Loss of their Cable*
0930 – 0945	*Break*
0945 – 1230	***Technologies That Use Optical Fibers*** *Low Speed Modems • 10 Base F/FDDI/FIORL • ATM*
1230 – 1245	*Break*
1245 – 1300	***Technologies That Use Optical Fibers (cont'd)*** *LAN's/MAN's/WAN's • Analog Modulators for Video and Microwave Links • HDTV*
1300 – 1315	***Course Conclusion***
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

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 fiber optic splicing, testing and troubleshooting exercises using the following state-of-the-art fiber optics technology and equipment, suitable for classroom training.

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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