COURSE OVERVIEW IT0001
Telecommunications Cables & Infrastructure

Course Title
Telecommunications Cables & Infrastructure

Course Date/Venue
Session 1: April 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: October 05-09, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
IT0001

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 our state-of-the-art equipment.

This course is designed to provide participants with a detailed and up-to-date overview of Telecommunications Cable & Infrastructure. It covers the network types, importance of structured cabling in industrial environments and key components of a network cables; the types of network cables and the cabling standards and safety in petrochemical environments; the cable testers and certifiers, crimping tools and punch-down tools, cable tracers, tone generators and fiber optic splicing tools; and the network topologies, documentation and labeling standards and cable pathways and infrastructure planning.

Further, the course will also discuss the techniques for pulling cables through conduits, avoiding damage during installation, strategies for large-scale cabling projects and cable separation; the termination of twisted pair cables, fiber optic cable installation and cable management systems; the compliance with standards and codes and the importance of testing during installation; the splicing techniques and using splicing machines effectively as well as polishing and inspecting fiber ends and OTDR (Optical Time-Domain Reflectometer) basics; and using cable testers, troubleshooting common issues and proper testing and certifying fiber optic cables.

During this interactive course, participants will learn the termination of cables in patch panels, identifying and labeling ports, managing patch cords for accessibility and integrating cable management accessories; the industrial network reliability, troubleshooting and repair techniques, diagnosing common network cable issues, repairing damaged cables and avoiding recurrence of installation faults; the integration of cabling for industrial control systems (ICS) with SCADA and PLC systems and choosing cables for data, power and control signals; planning proper cabling for high-speed networks, integrating wireless network and selecting cabling for explosion-proof areas; and integrating with surveillance and security systems and the network troubleshooting.

Course Objectives

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

- Apply and gain an in-depth knowledge on telecommunications cable and infrastructure
- Discuss network types, importance of structured cabling in industrial environments and key components of a network cables
- Identify the various types of network cables and explain cabling standards and safety in petrochemical environments
- Recognize cable testers and certifiers, crimping tools and punch-down tools, cable tracers and tone generators and fiber optic splicing tools
- Discuss network topologies, documentation and labeling standards and cable pathways and infrastructure planning
- Apply techniques for pulling cables through conduits, avoid damage during installation, strategies for large-scale cabling projects and cable separation
- Describe termination of twisted pair cables and apply fiber optic cable installation and cable management systems
- Comply with standards and codes and discuss the importance of testing during installation
- Carryout splicing techniques and use splicing machines effectively as well as polish and inspect fiber ends and discuss OTDR (Optical Time-Domain Reflectometer) basics
- Use cable testers, troubleshoot common issues and apply proper testing and certifying fiber optic cables
- Terminate cables in patch panels, identify and label ports, manage patch cords for accessibility and integrate cable management accessories
- Recognize industrial network reliability and implement proper troubleshooting and repair techniques by diagnosing common network cable issues, repairing damaged cables and avoiding recurrence of installation faults
- Integrate cabling for industrial control systems (ICS) with SCADA and PLC systems and choose cables for data, power and control signals
- Plan proper cabling for high-speed networks, integrate wireless network and select cabling for explosion-proof areas
- Integrate with surveillance and security systems and perform network troubleshooting

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 telecommunications cables and infrastructure for network installation technicians and contractors, project managers, IT managers and network administrators, compliance officers, legal advisors, contractors and subcontractors, building and facilities managers, regulatory authorities or inspectors, risk management professionals.

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: -

- 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 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. George Chel, PhD, MSc, BSc, Prince2, CISCO-CCNA, CISCO-CCENT, is a **Senior Communication & Telecommunications Engineer** with over **20 years** of extensive experience within the **Petrochemical**, **Oil & Gas** and **Power** industries specializing in **Fiber Optics** Technology, **Access Network** Planning, **Fiber Optics Transmission**, **Fiber Optic Cables** Construction, **Optical Drivers & Detectors**, **Fiber Optic** Termination, **Fiber Optic Cables** Installation, **Fiber Optics** System Design, **Media Converters**, **Fiber Optic** Systems Testing, **Optical Fibers** Technologies, **Opto-Electronics**, **Data Networking**, **Access Networks**, **Optical Networks**, DWDM, DSL, FTTH, GPON, **Wireless & Mobile Networks**, **Telecom** Technologies, **Core Network** Technologies, Broadband Architectures & Services, **Analogue & Digital Communications**, **IP Networking**, **Network Automation**, Software Defined Networking (**SDN**), Network Function Virtualization (**NFV**), Internet of Things (**IoT**), Converged Connectivity & Hybrid Access, RF Electronics & Digital Communications, **Communications Systems** Analysis, **Network Security**, **Computer Networks** Modelling & Simulation, **Data Networks & Communications**, **Networking Technology**, Networking Concepts, I**CT Systems** Management & Strategy, Strategic Information Systems, Wireless Access Points, Analogue & Digital Electronics, **Circuit Analysis**, **Circuit Design**, Electromagnetics, WiMAX Broadband Wireless System, Networking Design & Configurations, Practical **Industrial Data Communications & Telecommunications**, **Industrial Data Communication** Systems, Effective **Telecoms Strategies**, Integrated Electro-Optic Devices & Systems, **Telecom**, **Datacom & Network**, **EtherNet** Maintenance and Troubleshooting, Synchronous Digital Hierarchy (**SDH**), IP Telephony Design (**IPTD**) and LTE Technology (**WiMax**) Skills. He is currently the **Core Technologies Section Manager** of Hellenic Telecommunications Organization wherein he is responsible for managing, carrying, conducting, leading and participating in projects relating to the design, evaluation and trial of new aggregation/core network services & systems projects.

During his career, Dr. Chel has gained his practical and field experience through his various significant positions and dedication as the **Deputy Manager**, **Project Manager**, **Lab Section Head**, **Deputy Section Head**, **Program Leader**, **Access Technologies Senior Expert**, **Access Network Development Engineer**, **Telecom Engineer**, **Technical Engineer**, **Senior Expert**, **Senior Technical Instructor/Lecturer**, **Part-Time Lecturer**, **Development Engineer**, **R&D Engineer** and **Research Programmes Engineer**, **Post-Doctoral Research Associate** and **Teaching & Laboratory Assistant** from the Hellenic Telecommunication Organization – Deutsche Telekom Group, Fixed Access Shared Service Center – Deutsche Telekom Technology, OTE Academy, Athens Metropolitan College and Imperial College London.

Dr. Chel has a **PhD** in **Photonics**, **Optical Communications & Opto-Electronics** from the **Imperial College London**, **UK**, a **Master** degree in **Medical Physics & Clinical Engineering** from the **University of Sheffield**, **UK**, a **Bachelor** degree in **Physics** from the **University of Crete**, **Greece** and a **Graduate Diploma** in **Management** from the **University of London**, **UK**. Further, he is a **Certified Instructor/Trainer**, a **Registered PRINCE2 Project Management Practitioner**, a **Cisco Certified Network Associate Routing** and **Switching** (**CCNA**) and a **Cisco Certified Entry Networking Technician** (**CCENT**). Moreover, he is an author of many books, technical publication at high-profile scientific journals and conferences and deliver 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 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	***Introduction to Networking Basics*** *Overview of Network Types (LAN, WAN, MAN) • Importance of Structured Cabling in Industrial Environments • Key Components of a Network (Switches, Routers, Patch Panels, etc.) • Standards & Protocols (ISO/IEC 11801, TIA/EIA 568)*
0930 – 0945	*Break*
0945 – 1045	***Types of Network Cables*** *Coaxial Cables (Characteristics & Applications) • Twisted Pair Cables (Cat5e, Cat6, Cat6a, Cat7) • Fiber Optic Cables (Single-Mode versus Multi-Mode) • Shielded versus Unshielded Cables*
1045 – 1145	***Cabling Standards & Safety in Petrochemical Environments*** *IEEE, ANSI, & TIA Standards for Cabling • Explosion-Proof Standards & Certifications • Safety Protocols for Hazardous Locations • Grounding & Bonding Requirements*
1145 – 1230	***Tools & Equipment Overview*** *Cable Testers & Certifiers • Crimping Tools & Punch-Down Tools • Cable Tracers & Tone Generators • Fiber Optic Splicing Tools*
1230 – 1245	*Break*
1245 – 1330	***Understanding Network Topologies*** *Star, Ring, Bus, & Hybrid Topologies • Structured Cabling Architecture (Backbone & Horizontal Cabling) • Industrial Network Layouts for Petrochemical Facilities • Importance of Redundancy & Fault Tolerance*
1330 – 1420	***Documentation & Labeling Standards*** *Cable Numbering & Labeling Schemes • Rack & Patch Panel Labeling Practices • Importance of Network Diagrams & As-Built Documentation • Maintaining Organized Cable Management Systems*
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	***Cable Pathways & Infrastructure Planning*** *Tray Systems, Conduits, & Raceways • Routing Considerations in Petrochemical Facilities • Minimizing EMI (Electromagnetic Interference) • Adhering to Bend Radius & Pulling Tension Limits*
0830 – 0930	***Pulling & Laying Cables*** *Techniques for Pulling Cables Through Conduits • Avoiding Damage During Installation • Strategies for Large-Scale Cabling Projects • Cable Separation in Mixed Environments*
0930 – 0945	*Break*
0945 – 1100	***Termination of Twisted Pair Cables*** *T568A versus T568B Wiring Schemes • Crimping Connectors (RJ45) • Punching Down on Patch Panels & Keystone Jacks • Avoiding Common Termination Mistakes*
1100 – 1230	***Basics of Fiber Optic Cable Installation*** *Preparing Fiber Optic Cables for Installation • Types of Connectors (LC, SC, ST) • Cleaning & Preparing Connectors • Handling & Storage of Fiber Optic Cables*
1230 – 1245	*Break*
1245 – 1330	***Cable Management Systems*** *Horizontal & Vertical Cable Management Trays • Velcro versus Zip Ties: Best Practices • Maintaining Airflow & Aesthetics in Racks • Future-Proofing Cable Installations*
1330 – 1420	***Compliance with Standards & Codes*** *NFPA, IEC, & Local Petrochemical Regulations • Importance of Testing During Installation • Documentation & Reporting Requirements • Environmental Considerations in Cable Routing*
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	***Advanced Termination of Fiber Optic Cables*** *Splicing Techniques (Fusion & Mechanical Splicing) • Using Splicing Machines Effectively • Polishing & Inspecting Fiber Ends • OTDR (Optical Time-Domain Reflectometer) Basics*
0830 – 0930	***Testing & Certifying Copper Cables*** *Using Cable Testers (Continuity, Resistance, & Performance Tests) • Certifying Cat5e, Cat6, & Cat6a Cables • Troubleshooting Common Issues (Open, Short, Crosstalk) • Generating Test Reports*
0930 – 0945	*Break*
0945 – 1100	***Testing & Certifying Fiber Optic Cables*** *Insertion Loss & Return Loss Testing • Visual Fault Locators & Fiber Inspection Scopes • Tier 1 & Tier 2 Testing for Fiber Optics • Reporting & Analyzing Test Results*

1100 – 1230	***Patch Panel Termination & Organization*** *Terminating Cables in Patch Panels • Identifying & Labeling Ports • Managing Patch Cords for Accessibility • Integrating Cable Management Accessories*
1230 – 1245	*Break*
1245 – 1330	***Industrial Network Reliability*** *Shielding & Grounding in Harsh Environments • Protecting Cables from Heat, Chemicals, & Mechanical Stress • Redundancy Strategies for Mission-Critical Networks • Planning for Maintenance & Upgrades*
1330 – 1420	***Troubleshooting & Repair Techniques*** *Diagnosing Common Network Cable Issues • Tools for Quick Fault Location • Repairing Damaged Cables (Copper & Fiber Optic) • Avoiding Recurrence of Installation Faults*
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	***Cabling for Industrial Control Systems (ICS)*** *Integration with SCADA & PLC Systems • Choosing Cables for Data, Power, & Control Signals • EMI Protection in Industrial Networks • Synchronization of Cabling with Control Loops*
0830 – 0930	***Cabling for High-Speed Networks*** *Planning for 10Gbps & Higher Networks • Fiber Optics in High-Bandwidth Environments • Supporting IoT Devices in Industrial Networks • Importance of Bandwidth Testing*
0930 – 0945	*Break*
0945 – 1100	***Wireless Network Integration*** *Supporting Wired & Wireless Hybrid Systems • Installing Access Points & PoE Cabling • Site Surveys for Wireless Coverage • Managing Cabling for Outdoor Wireless Systems*
1100 – 1230	***Cabling for Explosion-Proof Areas*** *Selecting Cables & Enclosures for Hazardous Zones • Complying with ATEX & IECEx Standards • Installation Methods for Explosion-Proof Areas • Inspection & Maintenance Requirements*
1230 – 1245	*Break*
1245 – 1330	***Integration with Surveillance & Security Systems*** *Installing Cables for IP Cameras • PoE (Power over Ethernet) Cabling Considerations • Managing Cabling for Access Control Systems • Securing Network Cabling for Critical Infrastructure*
1330 – 1420	***Review of Emerging Trends*** *Advances in Fiber Optic Technologies • Modular & Pre-Terminated Cabling Systems • Impact of 5G on Structured Cabling • Sustainable Cabling 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 Four*

Day 5

0730 – 0830	***Hands-On Cable Termination Workshop*** *Terminating Twisted Pair Cables (RJ45) • Splicing & Testing Fiber Optic Cables • Assembling & Organizing a Patch Panel*
0830 – 0930	***Practical Installation Exercise*** *Pulling & Routing Cables through a Simulated Environment • Terminating & Testing Complete Cabling Runs • Identifying & Resolving Real-World Challenges*
0930 – 0945	*Break*
0945 – 1100	***Network Troubleshooting Scenarios*** *Simulating Common Network Issues • Diagnosing Faults Using Tools & Test Equipment • Proposing & Implementing Solutions*
1100 – 1215	***Project: Building a Small Industrial Network*** *Designing a Structured Cabling Layout • Installing & Certifying the Network • Documenting the Project for Handover*
1215 – 1230	*Break*
1230 – 1330	***Safety & Compliance Assessment*** *Reviewing Safety Procedures During Installation • Assessing Adherence to Industry Standards • Addressing Environmental Considerations*
1330 – 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*

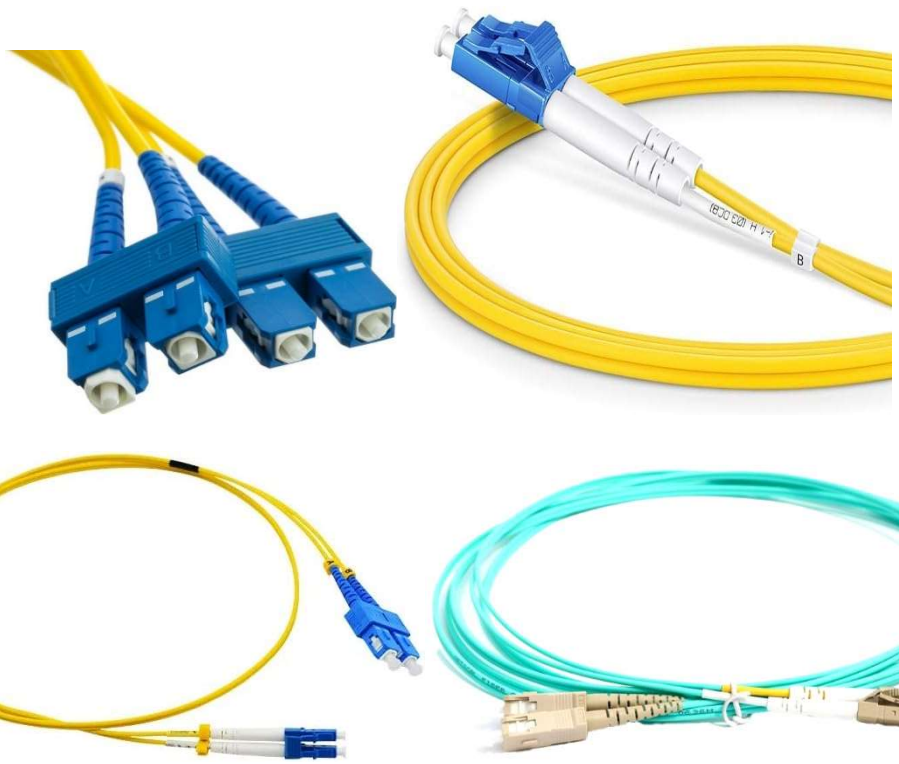
Practical Sessions

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.

Optical Fiber Fusion Splicer

Optical Fiber Comprehensive Tester

Optical Fiber Cold Connection Tools Set



Fiber Optic Patch Cables

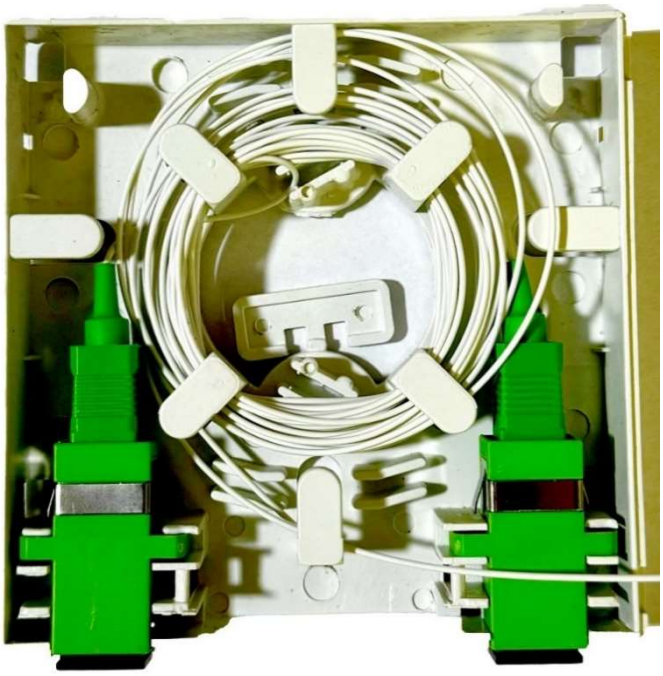
Fiber Optic Cable Tester

Fiber Optic Adapters

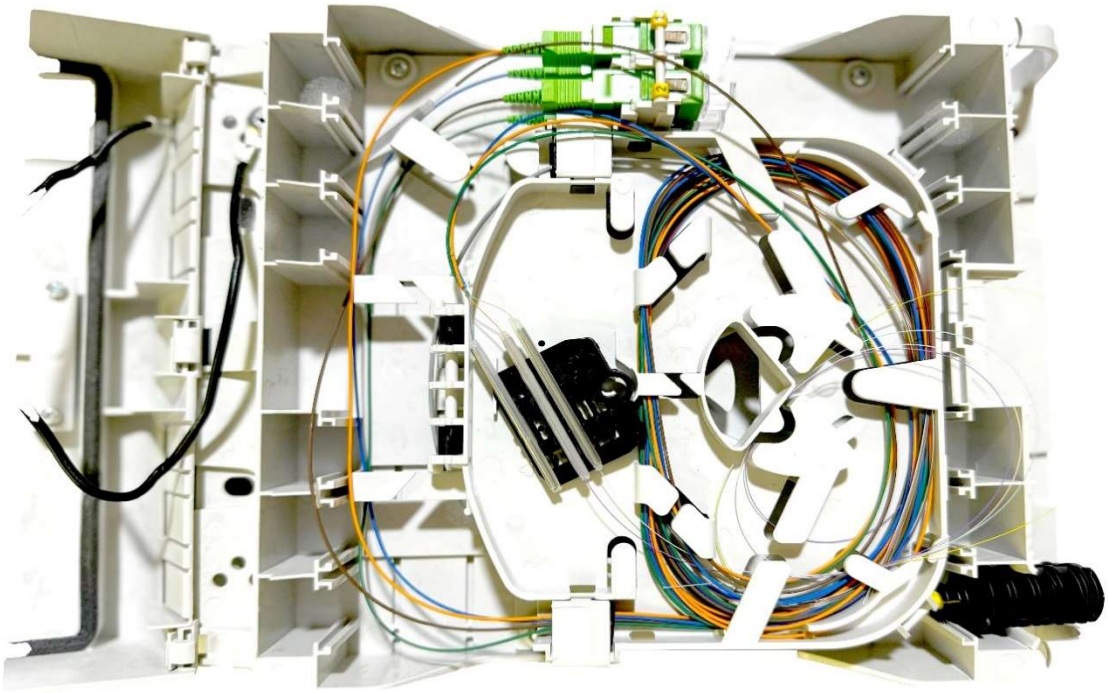
Fiber Optic Connectors

Fiber Optic Sleeves

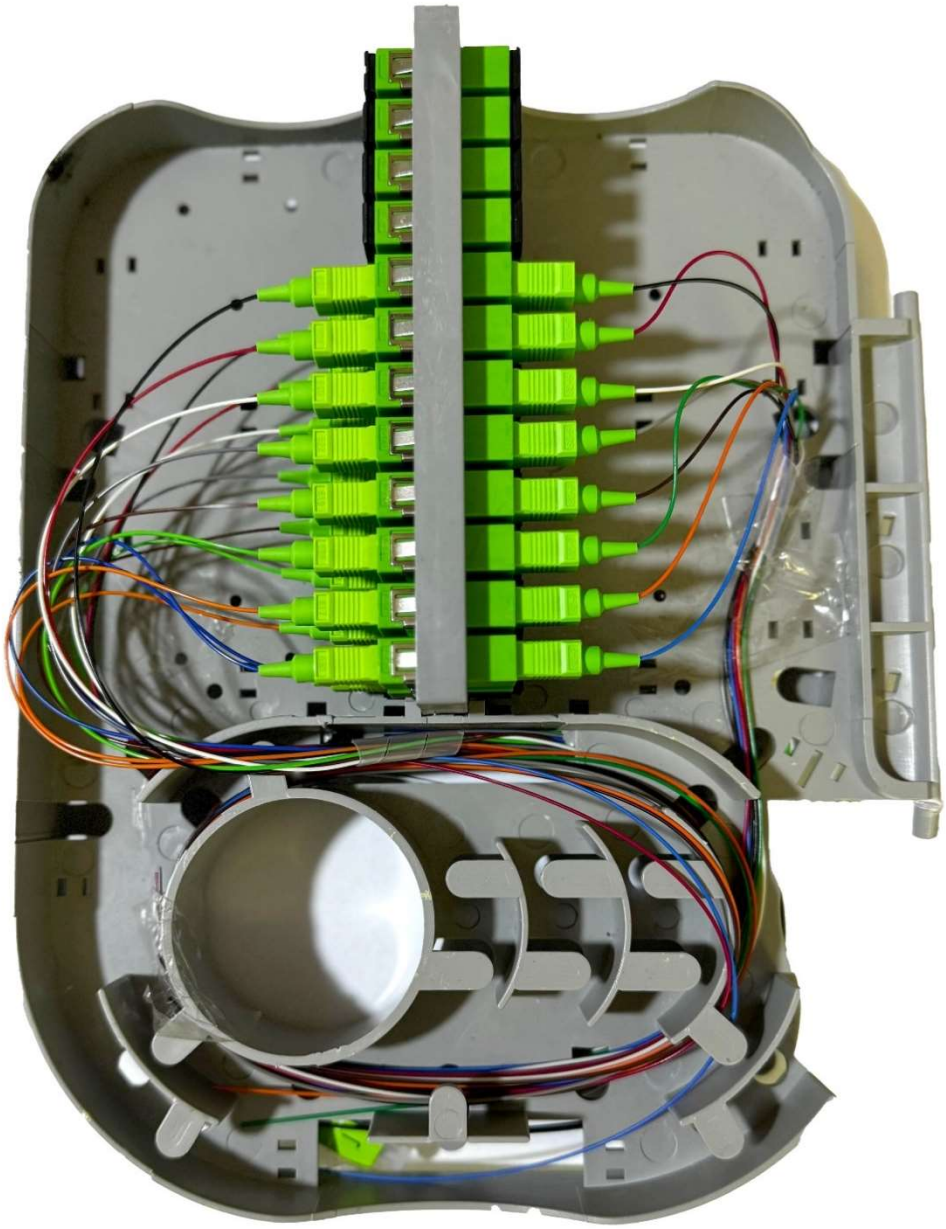
Fiber Optic Cables



Termination Box with Two Splicing Distribution



Patch Panel Using Direct Terminal



Fiber Optic Cable Box Connection with Multiple Terminations

Course Coordinator
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