

Hands-On

Fiber-to-the-Home/FTTH

Design, Installation, Maintenance & Troubleshooting Active and Passive Optical Networks



Course Description

This Hands-On 2-day course is designed to provide technicians with Hands-On practical experience and understanding the difference between ACTIVE and Passive Optic Networks (PONs). It will explain the difference of the two systems and how they provide the many services in FTTH applications.. This course provides the knowledge and skills to help students design, install, test and maintain Active and Passive Optical Networks (PONs) / Fiber-to the-Home (FTTH) systems.

Students Will Learn

- **ACTIVE and PON Applications and Systems Installation of FTTH Splicing, Connectors, Closures...**
- **Complete Testing FTTH from the Remote to The ONU...**
- **Testing the Customer Premise to Ensure it is FTTH Capable...**
- **All attendees will Build and Complete the Hands-on Portion of a FTTH System that will include**
 - **-Splicing**
 - **-Connectorization**
 - **-Testing**
 - **-Troubleshooting**

Target Audience

Technicians, installers, splicers, contractors, union craftsman, facilities managers, telecom managers, electricians, and anyone involved in repairing, installing, maintaining, designing, evaluating, or provisioning ACTIVE and PASSIVE FTTH systems.

Prerequisites

A basic understanding of telecommunications and basic fiber optic splicing, termination and testing is required prior to taking this course. This information can be obtained in our course(s)

- TeleCom Networks Today I or II
- Hands-On Fiber Optic ISP & OSP

Course Outline

Module I: Fiber Optic Refresher:

Students must have the prerequisite (BTS Hands-On Fiber ISP/OSP Combo course) or equivalent knowledge of these topics covered in this Module I section, this is just a refresher only, and again this familiarization is expected.

- Fiber optic theory and waveguide functions.
- Singlemode and Multimode fiber types.
- The causes of Attenuation, Optical Reflection and Refraction.
- Optical Dispersion characteristics and Pulse Spreading issues.
- The three basic elements of fiber optic systems & discuss their uses.
- Loose Tube and Unitube Style Trunk Cables
- Distribution and Feeder Cables.
- Fiber color code
- Fusion Splicer Applications and Fiber Alignment Systems
- Mechanical Splicing Uses and Applications
- Optical Connector Styles and Applications
- Back Reflection Issues and Angled Physical Contact Connectors
- Patch panels and functions for distribution and transmission
- Entrance Facility design and specifications
- OSP/PONs Style Splice Closure styles and function
- Cable Entry Methods and Splitter Configurations
- Drop Cable Connectivity and Security
- Cable Installation Methods as Direct Bury, Aerial and Ducted
- Safety Practices
- Complete fusion splice
- Complete mechanical splice
- Using power meter and light source test loss budget of system

Module II: PONs Systems and Applications

- PON Network Design Features
- Standards and Work Groups as FSAN, ITU & IEEE
- PON Architectures as APON, EPON, BPON, GPON, FTTH/ FTTx
- PON Topologies for Urban and Rural communities
- PON System End Equipment
- Splitters, ONUs/ONTs/OLTs/ODNs
- PON Transmitters and Receivers

WDM Technology with FTTH Systems
Visible Light Sources, OTDRs and Power Meters
Testing Methods for PONs Networks
PON OTDR Testing through splitters
PON Optical Loss Testing Methods
Design considerations for PONs Networks
Building a System Loss Budget
And more...

Module III: ACTIVE Systems and applications

ACTIVE network design features
ACTIVE architectures
Explanation of WDM used in ACTIVE systems
Testing at the different wavelengths
And more...

Module IV: FTTx Construction and Testing

Safe Cable Preparation Techniques
Closure Types used in FTTH Applications
Closure Preparation
Install Prepared OSP Cable into PON Closure
Fiber Routing to Splice Trays
Patch Panel Types and Fiber Dressing
Patch Panel Splice Tray Fiber Routing
PON Splitter Design and Installation Procedures
And more

Module V: FTTH splicing Connectorization - Testing

Splice PON splitter pigtail to OSP fiber
Splice FTTH ONU pigtail to fiber drop
Inspection procedures for FC/ST/SC connectors
Install appropriate connectors on 3mm jacketed jumper
Install breakout kit on OSP fiber cable
Install connector on 900u buffered fiber
Qualify and test splices and connectors
And more...

Module VI: Active/PON(FTTH) Qualification and Troubleshooting

PON wavelength and I of R OTDR Set-up Procedures
Testing at different wavelengths for ACTIVE systems
Measure Fiber Lengths, Events and Losses
Measure Reflectance for Acceptance
Measure Splitters for Acceptable Loss

FTTH System Test Traces
FTTH Loss Testing Procedures
Power Testing Levels
And more

Delivery Method

Instructor led with numerous Hands-On labs and exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

2 Days