NEW!

Broadband Fiber Optic Technician

Level 1

Foundational

Our Broadband Fiber Optic Technician (BFOT) curriculum consists of three progressive levels of FTTH-focused broadband technician training courses, each building upon the previous level. This comprehensive learning track is aimed at field technicians, installers, designers, and engineers who are new to fiber or new to broadband FTTH. Attendees will learn not only the hands-on skills needed to complete an installation, but also the theoretical background behind those skills.

Each level offers ETA certification as well as digital credentialing through Credly. After completing all three BFOT levels and gaining their respective ETA credentials, the learner will earn the benchmark Light Brigade Certified Broadband Fiber Optic Technician (CBFOT®) designation.

Broadband Fiber Optic Technician Level 1

This foundational level instructor-led course is comprised of a two-day introduction to broadband FTTH theory and fiber followed by two days of hands-on skills training to apply that theory to practical tasks. Completing the prerequisite Fiber Foundations online short course will prepare learners to enter this class with a basic understanding of fiber optic principles.

Areas of focus are FTTH and PON methodologies, topologies, optical distribution networks, cable management and installation practices, testing and maintenance, optical cable types, connectorization, splicing methods, and safety best practices.

Click or scan for detailed course information and upcoming locations.

Credentialing

COMING SOON

ETA® International Broadband Installer (BFI)

Valid for four years.

Light Brigade Digital Badge

Complete this course and receive a Credly digital badge.

Sumitomo Fusion Splicing Fundamentals Digital Badge

For training, tools, or equipment:

1 (206) 575-0404 • 1 (800) 451-7128 • lightbrigade.com

Light Brigade®

Broadband Fiber Optic Technician - Level 1

Detailed Course Outline

This foundational level instructor-led course is comprised of a two-day introduction to broadband FTTH theory and fiber followed by two days of hands-on skills training to apply that theory to practical tasks. Areas of focus are FTTH and PON methodologies, topologies, optical distribution networks, cable management and installation practices, testing and maintenance, optical cable types, connectorization, splicing methods, and safety best practices.

Prerequisites: Completing the prerequisite Fiber Foundations online short course will prepare learners to enter this class with a basic understanding of fiber optic principles.

Certifications and Credits: ETA Broadband Fiber Installer (BFI)
Light Brigade Digital Credential
Sumitomo Fusion Splicing Fundamentals Digital Credential

Theory and Applications Review

Introduction

- Basic signal communication
- Digital communications
- The binary system
- What is an optical fiber?
- Advantages of fiber optics
- What is a mode?
- The dBm scale
- Loss and attenuation
- Light loss measurement
- Basic units of measure in fiber optics
- FTTx optical fiber transmission system
- Fiber optic symbols

FTTx/PON Methodology

- Broadband FTTx terminology
- FTTH formats
- Network architecture
- Passive optical networks
- Active Ethernet
- Fiber to the building
- Passive optical LANs
- Fiber to the curb/pole
- Wavelength allocations
- TDM and TDMA
- ITU-T PON wavelengths
- Gigabit PON (G-PON)
- 10G-PON
- NG-PON2 network options (TWDM)
- Ethernet PON
- IEEE PON wavelengths
- 10 Gigabit EPON

Topologies

- Network topology
- Point-to-point topology
- Star topology
- PON star configurations
- Reach extension
- Route redundancy
- Mesh topology
- Ring topology
- Bus/tapered topology

ODN and OSP

- ODN capabilities
- OSP fiber and cable management

- Drop terminations
- Fiber and cable management

Fiber Theory

- Attenuation
- Optical reflection
- Optical dispersion
- Optical power loss
- Fresnel reflection
- Refraction
- Numerical aperture
- Intrinsic and extrinsic attenuation
- The electromagnetic spectrum
- Lightwave transmission

Fiber

- Single-mode step-index fibers
- Single-mode fiber characteristics
- FTTx fiber optic specifications
- ITU-T single-mode fiber types
- Optical fiber color coding

Cable

- Cable designs
- Optical cable for FTTx
- FTTx distribution and drop cables
- Stranded cables
- Unitube / central tube cables
- Aerial fiber optic cables
- Drop cables
- Indoor/outdoor cables
- Indoor optical cable ratings
- Low smoke zero halogen
- Distribution cables
- Standard cable cordage
- Sample optical cable specifications
- Fiber coating and buffer color codes
- Binder color codes

Fiber Optic Connectors

- Extrinsic splice and connection attenuation
- Fiber optic connector polishes
- Main connector components
- SC connectors
- LC connectors
- Multifiber push-on connectors
- Hardened fiber optic connectors
- Termination techniques
- Fiber optic connector inspection
- Connector inspection criteria
- Fiber optic endface inspection
- Isolating the cause
- Clean connectors matter!
- Other optical devices

Splicing

- Connectors versus splices
- Good splice requirements
- Traditional splice scenarios
- Splice performance variables
- Drop cable splicing
- Common fiber optic cleavers
- Fiber cleaving
- Fusion splicing methods
- Pigtail splicing and splice-on connectors
- Protecting the splice

Fiber & Cable Management

- Panels, closures and cabinets
- Fiber optic interconnect hardware
- Patch panels
- Splice panels
- Building entrance terminals
- Distribution panels
- FTTB panels
- FTTx OSP cable management products
- Cabinets for active Ethernet
- Fiber distribution hubs
- Fiber access terminals
- Pedestal cabling options
- Splice closure types
- Splice trays
- FTTx splice closures
- Multiport service terminals
- Network access points
- Fiber transition terminals
- Slack storage
- Vaults and handholes
- Indoor slack storage methods

- Underground cable storage
- Cable storage products
- Hardened connector slack storage

OLTs and ONTs

- FTTx optical fiber transmission system
- FTTx components
- Optical line terminal
- AE optical network terminal/unit
- ONT/ONU
- Battery backup/UPS systems

Installation

- FTTx cable installation
- FTTx installation disciplines
- General guidelines
- Cable handling
- Standards and regulations
- Code setting organizations
- National Electric Safety Code
- NESC considerations for aerial cabling
- Cable plant installation options
- Plan vault and handhole locations
- Underground installation techniques
- Direct buried
- Conduit and duct installation
- Cable pulling methods
- Tension monitoring
- Cable pulling lubricants
- Air blown fiber
- Elements of an ABF network
- Aerial installation methods
- Typical pole clearances
- Aerial installation techniques
- Mid-span (express) entries
- Mid-span cabling options
- Cable installation products
- Fiber installation inspection report

Testing

- FTTH testing and troubleshooting
- Test equipment and optical tests
- Testing active Ethernet
- Testing PON systems
- Initial installation testing
- Test equipment for different scenarios
- How the OTDR works
- OTDR testing
- OTDR and dynamic range
- OTDR dead zones
- Event signatures
- Fiber mismatches and gainers
- Key points to understanding index of refraction
- Post installation testing
- Post installation troubleshooting
- Testing drop cables
- Reflection testing
- OTDR testing for reflections
- Measuring reflectance with deadzone boxes
- OTDR types
- Key considerations for OTDRs
- OTDR acceptance test form
- Optical loss testing
- One- and two-jumper references
- Isolating a failure
- Identifying a high mated pair
- Optical loss test records
- Fiber identifiers
- Visual tracers
- Visual inspection equipment

Maintenance

- Identify – Locate – Resolve
- Typical cause of failures
- Types of fiber damage
- Frequently encountered problems
- Single-mode restoration planning
- Key restoration questions
- Common cable system faults
- Restoration responsibilities
- Reroute, repair, or replace?
- FTTx restoration flow chart
- Emergency restoration kit
- Restoration and troubleshooting tools
- Restoration locations
- Restoration recommendations
- Key elements of effective maintenance
- Post restoration

Safety Best Practices
- Fiber optic safety concerns
- Visual safety using magnification
- Wavelength and the eye
- Laser classifications
- Working with lasers
- Safety eyewear
- Working with optical fibers
- Personal protective equipment
- Chemical safety
- Safe cable handling
- The work area
- Installation safety
- Aerial safety

Wrap-up and Review

Hands-on Skills Learning

Lab Safety
- Practice safety during the labs for yourself and your fellow participants.

Review of Safety Practices

Cable Preparation for Termination
- Practice proper tool usage for cable and buffer tube preparation.
- Identify fiber optic cable and jacket types.
- Prepare a stranded cable for installation into a fiber closure/panel.
- Prepare buffer tube for a splice tray.
- Prepare a fanout kit.

Splicing and OTDRs
- Clean the test port and all connectors of an OTDR.
- Modify typical OTDR settings to obtain a clear interpretable trace.
- Recognize and interpret events depicted by an OTDR.
- Use an OTDR to test and identify events in a span.
- Use a launch box to enable identification of events close to the OTDR.
- Strip and cleave an optical fiber.
- Modify typical splicer settings to obtain a high-quality splice.
- Perform arc calibration on a fusion splicer.
- Create fusion splices on various fiber construction types.

Connectors
- Prepare and install a mechanical splice-on connector.
- Prepare and install a fuse-on connector.
- Clean a fiber connector endface.
- Use inspection scopes to view a connector endface.
- Use a light source and power meter to measure loss on a mated connector pair.
- Use a visual fault locator to identify nearby bends and breaks.
- Practice proper tool usage for connector preparation.

Optical Loss Testing
- Inspect and identify connector contamination.
- Clean connector endfaces using wet and dry cleaning methods.
- Clean connectors using commercially available fiber optic cleaning products.
- Identify damaged connectors.
- Use a light source and power meter to observe the effects of a macrobend and microbend on a fiber.
- Learn proper test reference methods.
- Create a loss budget for sample span of fiber.
- Measure optical loss for a span of fiber and compare to the calculated loss budget.
- Use a fiber identifier to detect active fibers