The Leader in Fiber Optic Training

We provide critical training for your personnel — improving efficiency, reducing costly errors, and lowering operating costs. Since 1987, Light Brigade has trained 60,000 technicians, installers, engineers, designers, and other support staff from a wide variety of industries.

Instructors
Our professional instructors work directly for us. They come from diverse backgrounds and have expertise in many aspects of fiber optics. With practical real-world experience in applications ranging from network design and installation to sensing and fiber characterization, our instructors provide valuable insights for our students.

Hands-on Training
Extensive hands-on training sessions help our attendees to learn skills and best practices by doing the work. Attendees spend class time working with cables, connectors, closures, splicers, and test equipment — whatever is appropriate for their specific course. Our 7:1 ratio of students to instructor ensures the direct personal attention needed for each student during their lab work.

Technology-based
Because we focus on the technology first, students can choose to develop their skills using our equipment, tools, and accessories, or bring their own to class and learn to use them more effectively.

Relevant
Our course materials are regularly updated to stay current with products, best practices, and emerging technologies, and reference the latest applicable standards and codes.

Ongoing Benefits for Our Alumni
Light Brigade alumni receive several valuable benefits, like free phone support. If you have a technical question or need some guidance, our support staff is just a phone call away.

Graduates of our three and four-day courses also qualify for generous discounts on subsequent courses for up to four years after taking class and are eligible for special discount offers on some fiber optic equipment and cleaning supplies.
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Keep an eye out for these icons with special pricing options. See page 20 for details.
Recommended Learning Paths

FF................. Fiber Foundations
FO123 .......... Fiber Optics 1-2-3
FTTx .......... FTTx for Installers & Technicians
UTIL L1 .......... Utilities Level 1
UTIL L2 .......... Utilities Level 2
UTIL L3 .......... Utilities Level 3
ER ............... Emergency Restoration
ADV ............. Advanced OSP Technician
OTDR .......... OTDR Deep Dive
FC ............... Fiber Characterization

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com
Need a road map? Check out a few of the many possibilities.
On-site & Customized Training

Benefits of On-site Training

- **Convenience**
  Schedule training exactly where and when you need it.

- **Cost Savings**
  Save travel time and expenses by bringing training to your facility.

- **Expertise**
  Learn on your own equipment or have us bring our extensive inventory of equipment and supplies. You decide!

- **Flexibility**
  Courses can be scheduled throughout the year and delivered at different company locations.

Customized Training

Don’t see exactly what you’re looking for?

Need training on something more unique or specific to your business?

Our subject matter experts can work with you to develop a course that meets your precise needs and then deliver it at your location. Whether you require small or large changes, we have the experts who can give your team the knowledge and skills needed to get the job done right.
The two-day classroom portion of our Fiber Optics 1-2-3 course has been wildly popular for those who want to learn about fiber optic technology but don’t require the hands-on skills training. Light Brigade now offers a virtual classroom option that brings these two days of classroom learning directly to you. Connect remotely to a LIVE class where you will be part of the action — able to ask questions and hear comments from other attendees in real-time — all without the added travel time and expense.

Benefits of Remote Classes

- Learn in the comfort of your own home or office.
- Attend classes that may not be available in your immediate area.
- More opportunities to attend. Never be turned away from a full class.
- Less time away from work.
- Save on travel expenses.

Look for the 🎧 to see which classes offer remote training or call us for more details.
This instructor-led course provides a fundamental understanding of fiber optics, coupled with the practical hands-on skills training required to install and maintain fiber optic networks. Perfect for those new to fiber or those looking to enhance their current skill set. Two days of classroom time are dedicated to the understanding of fiber technology and network components, followed by two days of hands-on skills training to develop cable preparation, termination, splicing, and testing skills.

**Audience:** Field technicians, installers, IT support staff, engineers, field supervisors, OSP staff, maintenance techs, or technical sales staff

**Prerequisite:** Fiber Foundations recommended, but not required

### Course Outline

#### Classroom (2 Days)
- Introduction to Fiber Optics
- Fiber Theory
- Multimode and Single-mode fibers
- Fiber Optic Cables
- Fiber Optic Connectors
- Splicing
- Fiber and Cable Management
- Installation
- Test Equipment
- Testing Best Practices
- Restoration
- Safety
- Communication System Basics
- Loss Budgets

#### Hands-on (2 Days)

**Station #1 – Splicing**
- Fusion / Mechanical / Pigtail
- Fiber Handling and Cleaving

**Station #2 – Connectorization**
- Multiple Bonding Methods
- Visual Inspection / Cleaning
- Cable Assembly Testing

**Station #3 – Cable Preparation**
- Loose Tube Cable Preparation
- Breakout and Distribution Cable Preparation
- Patch Panel and Splice Closure Preparation
- Mid-entry Practices

**Station #4 – OTDR Operation**
- Acceptance Testing
- Reflection Testing
- Span Testing and Splice Loss
- Emergency Restoration
- Troubleshooting

**Station #5 – Optical Loss Testing**
- Link Loss Measurement
- Transmit and Receive Power

### Certification

**ETA International Fiber Optic Installer**

This certification is designed for those working with both multimode and single-mode fibers. ETA FOI certification is valid for four years. Certification testing is available to four-day class attendees only.

- BICSI: 30 ITS CECs (four-day)
- BICSI: 15 ITS CECs (two-day)

### Early Bird Pricing*

<table>
<thead>
<tr>
<th>Four-day course &amp; e-manual</th>
<th>$1700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-day classroom only</td>
<td>$900</td>
</tr>
<tr>
<td>Optional ETA FOI exam</td>
<td>$150</td>
</tr>
</tbody>
</table>

Printed manual available for purchase.

*See page 20 for more information.

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com
Upcoming Fiber Optics 1-2-3 Locations

**JANUARY 8-11**
Raleigh, NC  
St. Louis, MO

**JANUARY 15-18**
Huntsville, AL

**JANUARY 29-FEBRUARY 1**
Columbus, OH  
San Diego, CA

**FEBRUARY 5-8**
Anchorage, AK  
Atlanta, GA  
Salt Lake City, UT

**FEBRUARY 12-15**
Dallas, TX  
Seattle, WA

**FEBRUARY 19-22**
Albuquerque, NM  
Colorado Springs, CO

**FEBRUARY 26-MARCH 1**
Orlando, FL  
Portland, OR

**MARCH 5-8**
Minneapolis, MN  
Richmond, VA  
Vancouver, BC

**MARCH 12-15**
Frankfort, KY  
Houston, TX  
Spartanburg, SC

**MARCH 19-22**
Fremont, CA  
Helena, MT  
Omaha, NE  
Portland, ME

**MARCH 26-29**
Hartford, CT  
Newark, NJ  
Seattle, WA

**APRIL 2-5**
Atlanta, GA  
Fargo, ND  
Sioux Falls, SD

**APRIL 9-12**
Geneva, IL  
Lansing, MI  
Las Vegas, NV  
Tulsa, OK

**APRIL 15-18**
Charlotte, NC  
Cincinnati, OH

**APRIL 23-26**
Milwaukee, WI  
San Diego, CA

**APRIL 30-MAY 3**
New Orleans, LA  
Washington, DC

**MAY 7-10**
City of Industry, CA  
Mobile, AL  
Providence, RI

**MAY 14-17**
Idaho Falls, ID  
Nashville, TN  
Raleigh, NC

**MAY 20-23**
Sacramento, CA  
Savannah, GA  
Spokane, WA

**JUNE 4-7**
Edmonton, AB  
Seattle, WA

**JUNE 11-14**
Denver, CO  
Virginia Beach, VA

**JUNE 18-21**
Baltimore, MD  
Salt Lake City, UT  
St. Louis, MO

**JUNE 25-28**
Indianapolis, IN  
Lowell, MA

**JULY 9-12**
Spartanburg, SC  
Vancouver, BC

**JULY 16-19**
Austin, TX  
Louisville, KY

**JULY 23-26**
Miami, FL  
Reno, NV

**JULY 30-AUGUST 2**
Jacksonville, FL  
Seattle, WA

**AUGUST 6-9**
Cleveland, OH  
Jackson, MS  
San Bruno, CA

**AUGUST 13-16**
Atlanta, GA  
Philadelphia, PA

**AUGUST 20-23**
Charleston, SC  
Hasbrouck Heights, NJ  
Salt Lake City, UT

**AUGUST 26-29**
Burbank, CA

**SEPTEMBER 10-13**
Seattle, WA  
Tampa, FL  
Washington, DC

**SEPTEMBER 17-20**
Dallas, TX  
Pensacola, FL

**SEPTEMBER 24-27**
Minneapolis, MN  
San Diego, CA

**OCTOBER 1-4**
Memphis, TN  
Richmond, VA  
Worcester, MA

**OCTOBER 8-11**
Annapolis, MD  
Charlotte, NC

**OCTOBER 15-18**
Atlanta, GA  
New Orleans, LA  
Savannah, GA

**OCTOBER 22-25**
Anchorage, AK  
Orlando, FL  
Seattle, WA

**OCTOBER 29-NOVEMBER 1**
Birmingham, AL  
Calgary, AB  
Denver, CO  
Spartanburg, SC

**NOVEMBER 5-8**
Las Vegas, NV  
Topeka, KS

**NOVEMBER 12-15**
Madison, WI  
San Antonio, TX  
Seattle, WA

**NOVEMBER 19-22**
Augusta, GA

**DECEMBER 3-6**
Chattanooga, TN  
El Paso, TX

**DECEMBER 10-13**
Ft. Lauderdale, FL  
Omaha, NE  
Stamford, CT

**DECEMBER 17-20**
Boise, ID  
Dallas, TX  
Seattle, WA

 Specifications and class dates are subject to change without notice
Fiber Optics for Enterprise Networks

This three-day, instructor-led course provides the practical knowledge and hands-on skills training required to properly design, install, and maintain fiber optic premises and data center networks. Attendees will use the latest fiber optic technology and equipment to splice, connectorize, test, and troubleshoot multimode and single-mode fiber networks in order to increase efficiency and reliability, as well as reduce costs and downtime.

**Audience:** Installation contractors and end users involved in building and maintaining premises networks and data centers

**Prerequisite:** Fiber Foundations recommended, but not required

Course Outline

**Classroom (1.5 Days)**
- Introduction
- Applications
- Standards and Codes
- Fiber Optic Transmission Theory
- Multimode Optical Fibers
- Single-mode Optical Fibers
- Optical Cables
- Fiber Management Products
- Connectors
- Fiber Splicing
- Installation
- Test Equipment
- Testing
- System Design
- Safety

**Hands-on (1.5 Days)**

<table>
<thead>
<tr>
<th>Station #1 – Cable Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tight Buffered Cable Preparation</td>
</tr>
<tr>
<td>Loose Tube Cable Preparation</td>
</tr>
<tr>
<td>Fanout Kit Installation</td>
</tr>
<tr>
<td>Wire Mesh Pulling Grips</td>
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<tr>
<td>Pre-terminated Cable Protection</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Station #2 – Connectorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field-installable Connectors</td>
</tr>
<tr>
<td>Splice-on Field-installable Connectors</td>
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<tr>
<td>900-micron Multimode Jumpers</td>
</tr>
<tr>
<td>Attenuation Measurement</td>
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<table>
<thead>
<tr>
<th>Station #3 – Fusion Splicing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning and Fiber Cleaving Processes</td>
</tr>
<tr>
<td>Attenuation Measurement</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Station #4 – Testing</th>
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</thead>
<tbody>
<tr>
<td>Single-mode Insertion Loss Testing</td>
</tr>
<tr>
<td>Multimode Insertion Loss Testing</td>
</tr>
<tr>
<td>Single and Multifiber Connector Testing</td>
</tr>
<tr>
<td>Connector Inspection</td>
</tr>
<tr>
<td>OTDR Testing</td>
</tr>
<tr>
<td>Measure Optical Return Loss</td>
</tr>
<tr>
<td>Compute a Link Loss Budget</td>
</tr>
</tbody>
</table>

**Early Bird Pricing***

| Three-day course | $1500 |

**Upcoming Locations**

<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charlotte, NC</td>
<td>February 26-28</td>
</tr>
<tr>
<td>Tampa, FL</td>
<td>April 9-11</td>
</tr>
<tr>
<td>Dallas, TX</td>
<td>May 14-16</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>August 6-8</td>
</tr>
<tr>
<td>Las Vegas, NV</td>
<td>October 8-10</td>
</tr>
<tr>
<td>Lowell, MA</td>
<td>December 17-19</td>
</tr>
</tbody>
</table>

**Certification**

ETA Fiber Optic Technician — Inside Plant

This certification is designed for those working with multimode and single-mode fiber in enterprise and data center applications. ETA certification is valid for four years.

BICS: 20 ITS CECs

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com
This three-day instructor-led course features one day of classroom theory that delivers a quick refresher on fiber terminology and technology before diving into FTTx, emergency restoration, fiber characterization, and how the latest industry trends may impact field practices. This is followed by three days of hands-on skills training, where attendees build and troubleshoot a passive optical network from patch panel to patch panel through various splice closures with multiple drops.

**Audience:** Fiber optic technicians, team leaders, installers, outside plant maintenance staff, or staff engineers

**Prerequisite:** Any Light Brigade introductory courses like Fiber Optics 1-2-3 or equivalent field experience

### Course Outline

**Classroom (1 Day)**
- Safety
- Terminology and Concept Review
- Trends in Fiber Optics
- FTTx Fundamentals
- Emergency Restoration
- Introduction to Fiber Characterization

**Hands-on (3 Days)**

**Station #1 – Cable Preparation**
- OSP Cable and Closure Preparation
- Mid-entry Practices on OSP Loose Tube Cables

**Station #2 – Splicing**
- Fusion, Mechanical, and Ribbon Splicing
- Splice-on Terminations
- Connector Testing and Inspection

**Station #3 – Loss Testing**
- Building LAN Panels
- Total Span Testing
- Reflection and Optical Return Loss Testing

**Station #4 – OTDRs**
- Interpreting OTDR Results
- Span Troubleshooting and Restoration

### Upcoming Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seattle, WA</td>
<td>January 22-25</td>
</tr>
<tr>
<td>Miami, FL</td>
<td>January 29-February 1</td>
</tr>
<tr>
<td>Anchorage, AK</td>
<td>February 12-15</td>
</tr>
<tr>
<td>Kansas City, MO</td>
<td>February 19-22</td>
</tr>
<tr>
<td>Dallas, TX</td>
<td>March 19-22</td>
</tr>
<tr>
<td>Denver, CO</td>
<td>March 26-29</td>
</tr>
<tr>
<td>Seattle, WA</td>
<td>April 23-26</td>
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<tr>
<td>Albany, NY</td>
<td>June 4-7</td>
</tr>
<tr>
<td>Tampa, FL</td>
<td>July 16-19</td>
</tr>
<tr>
<td>Lowell, MA</td>
<td>August 26-29</td>
</tr>
<tr>
<td>Spartanburg, SC</td>
<td>September 24-27</td>
</tr>
<tr>
<td>Portland, OR</td>
<td>October 1-4</td>
</tr>
<tr>
<td>Seattle, WA</td>
<td>October 8-11</td>
</tr>
<tr>
<td>Salt Lake City, UT</td>
<td>October 29-November 1</td>
</tr>
<tr>
<td>Dallas, TX</td>
<td>November 5-8</td>
</tr>
<tr>
<td>Ann Arbor, MI</td>
<td>November 19-22</td>
</tr>
</tbody>
</table>

### Certification

**ETA Fiber Optic Technician — Outside Plant**

This certification is for those installing outside plant single-mode fiber optic networks. ETA FOT-OSP certification is valid for four years.

BICSI: 31 ITS CECs

### Early Bird Pricing*

- Four-day course & e-manual . . . . . . **$1800**
- Optional ETA FOT-OSP exam . . . . . . **$150**

Printed manual available for purchase.

* See page 20 for more information.
Emergency Restoration

This two-day instructor-led course focuses on fault location, troubleshooting, and test equipment with a heavy emphasis on hands-on skills training that simulates actual field restorations for both retrievable and non-retrievable slack scenarios. Attendees will gain the knowledge and skills necessary to help their organizations to better deal with outages.

**Audience:** Fiber optic technicians, engineers, or managers who work in the OSP environment

**Prerequisite:** Any Light Brigade introductory courses like Fiber Optics 1-2-3, Utilities Level 1 Technician, or equivalent field experience

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**Course Outline**

**Classroom (0.5 Day)**
- Fiber and Fiber Theory
- Optical Cable
- Connectors
- Fiber and Cable Management
- Splicing
- Test Equipment
- Optical Testing
- Documentation
- Restoration Planning
- Retrievable and Nonretrievable Slack
- The Restoration
- Safety

**Hands-on (1.5 Days)**
- **Safety Meeting**
- **Restoration Simulation**
  - Build an Emergency Restoration Kit
  - Build a Simulated Fiber Optic System
  - Test the Span with an OTDR
  - Perform a Loss Budget
  - Perform Optical Loss Testing
  - Define the Simulated Outage
  - Accurately Measure Distance
  - Measure Optical Distance
  - Field Repair Simulation
  - Retest and Document the System

**Upcoming Locations**
- **Seattle, WA**
  - April 16-17
- **Spartanburg, SC**
  - August 27-28

**Certificate**

Light Brigade Certificate of Completion

Complete this course and receive a Light Brigade Certificate of Completion.

**Early Bird Pricing***

| Two-day course | $1100 |

* See page 20 for more information.

 Specifications and class dates are subject to change without notice.
OTDR & Testing Deep Dive Workshop

This two-day instructor-led course focuses on field testing and troubleshooting fiber optic spans/links and explains the various types of equipment and tools needed for acceptance testing, documenting performance, and finding problems in a fiber physical plant. The emphasis is on understanding proper OTDR settings, overall testing, and evaluating results.

**Audience:** Installers, OSP technicians, maintenance techs, field supervisors, or senior technicians

**Prerequisite:** Fiber Optics 1-2-3 or field experience with fiber optic testing. Fiber Foundations recommended, but not required

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**Course Outline**

**Classroom (1 Day)**

- **Introduction**
  - Optical Loss Test Sets
  - Proper Cleaning and Inspection Tools
  - Visual Fault Finders
  - Optical Fiber Identifiers
  - OTDR Theory and Operation

- **Testing Demonstrations**

**Hands-on (1 Day)**

**Station #1**

- Reading OTDR Signatures
- Selecting the Correct Pulsewidth
- Using Launch and Receive Cables or Terminators
- Determining Helix Factor
- Testing Close-in Events
- Bidirectional Testing
- Locating Breaks
- Advanced Trace Analysis
- Acceptance Testing

**Station #2**

- Connector Cleaning and Inspection
- Connector Endface Evaluation
- Testing Transmit and Receive Power
- Calculating Dynamic Range
- Setting Up Tier 1 Testing
- Dual Wavelength Bidirectional Optical Loss Testing
- Creating Multimode Launch Conditions
- Identifying Live Fibers and Tone Identification
- Creating a System Loss Budget

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**Upcoming Locations**

<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seattle, WA</td>
<td>February 12-13</td>
</tr>
<tr>
<td>Minneapolis, MN</td>
<td>March 5-6</td>
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<tr>
<td>Washington, DC</td>
<td>April 30-May 1</td>
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<tr>
<td>Mobile, AL</td>
<td>May 7-8</td>
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<tr>
<td>Austin, TX</td>
<td>July 16-17</td>
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<tr>
<td>Cleveland, OH</td>
<td>August 6-7</td>
</tr>
<tr>
<td>Boise, ID</td>
<td>September 17-18</td>
</tr>
<tr>
<td>Atlanta, GA</td>
<td>October 15-16</td>
</tr>
<tr>
<td>Las Vegas, NV</td>
<td>November 5-6</td>
</tr>
</tbody>
</table>

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**Certificate**

- Light Brigade Certificate of Completion
- Complete this course and receive a Light Brigade Certificate of Completion.
- BICSI: 12 ITS CECs

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**Early Bird Pricing***

Two-day workshop ........ 

$950

* See page 20 for more information.

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com

Specifications and class dates are subject to change without notice
FTTx Training Courses

FTTx for Installers and Technicians
This four-day instructor-led course is designed to provide useful technical knowledge of fiber optics relating to FTTx applications, as well as the skills needed to install and test the physical layer for active Ethernet and passive optical networks (PON).

Audience: Beginner and experienced technicians, or supervisors
Prerequisite: Fiber Foundations recommended, but not required

Classroom (2 Days)
- FTTx Methodology
- Optical Fiber and Cable
- Termination Options
- Splitters
- OLTs and ONTs
- Panels, Closures, and Cabinets
- Installation, Maintenance, and Restoration

Hands-on (2 Days)
- Cable, Closure, and Panel Preparation
- Mid-entry Practices
- Inline and Pigtail Splicing
- OTDR Testing and Signature Interpretation
- Testing Splitters
- Testing OLT and ONT Power Levels
- Troubleshooting

Certified Fiber to the Home Professional (CFHP)
This two-day instructor-led course focuses on the fundamentals of FTTH architecture, network design, deployment technology, and operational skills. It covers everything from FTTx components to FTTx systems, including discussion around the business issues involved with planning FTTx deployments.

Audience: Those involved in the planning and deployment of FTTx networks
Prerequisite: Fiber Foundations recommended, but not required

Classroom (2 Days)
- Applications
- Bandwidth Issues
- Economics
- Theory and Fibers
- FTTH Standards
- Network Topologies
- Network Components
- Cable Management
- Cable and Fiber Termination
- Splitter Placement
- Network Design
- Fiber to the Building
- Loss Budgets
- Test Disciplines

Early Bird Pricing*
- Four-day course & e-manual $1700
- Optional ETA FOT-OSP exam $150
- Printed manual available for purchase.

ETA Fiber Optic Technician — Outside Plant
Valid for four years.
BICSI: 30 ITS CECs
- Oklahoma City, OK March 12-15
- Lowell, MA April 30-May 3
- Seattle, WA June 25-28
- Tampa, FL July 9-12
- Dallas, TX August 13-16
- Vancouver, BC September 17-20
- Nashville, TN October 1-4
- Charlotte, NC December 3-6

Early Bird Pricing*
- CFHP course, e-manual, & exam $995
- Online training course $1995
- Printed manual available for purchase.

FBA Certified Fiber to the Home Professional
Valid for three years.
- Orlando, FL June 6-7
- Dallas, TX October 23-24

* See page 20 for more information.
## Certification

### OTT Certified Optical Network Associate (CONA)

This five-day instructor-led course examines how to design, plan, and implement cost-effective, high-speed networks from single channel systems to multiple channel options using CWDM and DWDM. Attendees will work together on interactive design projects to establish requirements for proper system performance and determine how the network can be affected by the properties of the physical infrastructure.

**Audience:** Outside plant and network engineers  
**Prerequisite:** Knowledge of fiber theory and basic network engineering concepts

## OTT Certified Optical Network Associate (CONA)

### Classroom and Design Exercises (3 Days)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Location</th>
<th>Dates</th>
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</thead>
<tbody>
<tr>
<td>FTTH Fiber Planning</td>
<td>Raleigh, NC</td>
<td>January 15-17</td>
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<tr>
<td>Futureproofing</td>
<td>Omaha, NE</td>
<td>February 19-21</td>
</tr>
<tr>
<td>PON Design Options</td>
<td>Raleigh, NC</td>
<td>April 2-4</td>
</tr>
<tr>
<td>Take Rate / Splitter Location</td>
<td>Orlando, FL</td>
<td>June 5-7</td>
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<tr>
<td>Fundamental Design Steps</td>
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<td>July 23-25</td>
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<td>Seattle, WA</td>
<td>October 15-17</td>
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<table>
<thead>
<tr>
<th>Topic</th>
<th>Location</th>
<th>Dates</th>
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<tr>
<td>Campus Style Apartments</td>
<td>Raleigh, NC</td>
<td>January 15-17</td>
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<td>High Rise Buildings</td>
<td>Omaha, NE</td>
<td>February 19-21</td>
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<td>Subdivisions</td>
<td>Raleigh, NC</td>
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<td>Rural Areas</td>
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<td>WDM-PON Considerations</td>
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<th>Topic</th>
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<th>Dates</th>
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<td>General Design Steps</td>
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<td>Home Run Strategies</td>
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<td>Splitter Cabinets</td>
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<td>Distributed Split Design</td>
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<td>Design Exercises</td>
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<td>October 15-17</td>
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</table>

### Early Bird Pricing*

<table>
<thead>
<tr>
<th>Component</th>
<th>Price</th>
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<tbody>
<tr>
<td>Three-day course</td>
<td>$1500</td>
</tr>
<tr>
<td>Optional FTTx OSP exam</td>
<td>$150</td>
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### FBA FTTx OSP Design

Valid for three years.

<table>
<thead>
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<th>Location</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Raleigh, NC</td>
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</tr>
<tr>
<td>Omaha, NE</td>
<td>February 19-21</td>
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<tr>
<td>Seattle, WA</td>
<td>October 15-17</td>
</tr>
</tbody>
</table>

*See page 20 for more information.
Fiber Characterization

**Fiber Characterization Fundamentals**

This two-day instructor-led course focuses on the principles behind building and maintaining high-speed optical networks where key parameters such as polarization mode dispersion and chromatic dispersion must be calculated to evaluate system capabilities and potential upgrades to higher bit rates.

**Audience:** Those involved with equipment or systems where fiber characterization is needed to ensure proper operation of 10 Gb/s or higher data rates

**Prerequisite:** Previous experience with fiber optics and some knowledge of OTDR testing

<table>
<thead>
<tr>
<th>Classroom (1 Day)</th>
<th>Hands-on (1 Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Fiber and Connectors</td>
<td></td>
</tr>
<tr>
<td>Components Overview</td>
<td></td>
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<tr>
<td>Regeneration</td>
<td></td>
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<tr>
<td>Optical Multiplexing</td>
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<tr>
<td>Dispersion and Polarization</td>
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<tr>
<td>Test Equipment</td>
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<tr>
<td>Build Spans and Test for PMD and CD</td>
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<tr>
<td>Reflection Testing</td>
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<tr>
<td>PMD and CD Documentation</td>
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</table>

**OTT Certified Fiber Characterization Engineer (CFCE)**

This five-day instructor-led course focuses on mastering the tests required to verify that an infrastructure can support high data rate (10+ Gb/s) applications, Raman amplification, and extended wavelength ranges for CWDM and DWDM systems, as well as those typically required to prove that the fiber will operate properly when dark fiber contracts are signed.

**Audience:** OSP and network engineers, senior technicians, or designers

**Prerequisite:** Previous experience with fiber optics and some knowledge of OTDR testing

**Classroom and Hands-on Exercises (5 Days)**

<table>
<thead>
<tr>
<th>Bidirectional Loss Testing</th>
<th>OCL Testing</th>
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</thead>
<tbody>
<tr>
<td>OTDR Testing</td>
<td>CD, PMD and Spectral Attenuation Testing</td>
</tr>
<tr>
<td>Documentation and Reporting</td>
<td></td>
</tr>
</tbody>
</table>

**Early Bird Pricing***

| Two-day course | $1100 |

* See page 20 for more information.

**Upcoming Locations**

| Dallas, TX | February 26-27 |
| Boise, ID  | June 11-12     |
| Seattle, WA| August 27-28   |

**Certificate**

**Light Brigade Certificate of Completion**

**Upcoming Locations**

| Lowell, MA | March 25-29 |
| Seattle, WA| June 10-14  |
| Spartanburg, SC | September 30-October 4 |
| Lowell, MA  | November 18-22 |

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com

Specifications and class dates are subject to change without notice.
Level 1 Technician
This three-day instructor-led course teaches basic fiber optic theory and the products used in fiber networks, focusing on the proper installation and maintenance of aerial and underground utility fiber optic systems. Hands-on skills training includes splicing, termination, testing, and troubleshooting to increase efficiency, reliability, and deployment speed in the field.

Audience: Installers and technicians in the utilities telecom industry
Prerequisite: Fiber Foundations recommended, but not required

Level 2 Designer
This one-day course examines fiber optic design parameters, cable management alternatives, route planning, optical testing requirements, test results interpretation, and cable system design.

Audience: Those involved in the design, administration, operation, and supervision of utility-based fiber optic networks
Prerequisite: Any Light Brigade introductory courses like Fiber Optics 1-2-3, online training, or equivalent field experience

Level 3 Advanced Designer
This one-day course focuses on DWDM systems and transmission impairments such as PMD and CD that limit the bandwidth and operating rates of fiber optic transmission systems. It covers xWDM theory and applications with a special emphasis on fiber dispersion limits and system design considerations.

Audience: Design engineers, or project managers
Prerequisite: Knowledge of fiber optic theory, plus field experience or formal training such as Fiber Optics for Utilities Level 2 Designer

Early Bird Pricing*

<table>
<thead>
<tr>
<th>Level 1 Technician</th>
<th>$1500</th>
</tr>
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<tbody>
<tr>
<td>Level 2 Designer</td>
<td>$600</td>
</tr>
<tr>
<td>Level 1 &amp; Level 2 (Save $300)</td>
<td>$1800</td>
</tr>
</tbody>
</table>

Level 3 Advanced Designer
Custom course only; call for details

Certification for any level
UTC member rate ............ $175
Non-member rate ............. $275

* See page 20 for more information.
This four-day instructor-led introductory course provides the fundamentals needed to understand fiber optic applications and challenges in the FTTA/cell site space. Fiber, cable, connectivity, field tools, and equipment are taught and applied to cell sites as well as macrocell, microcell, femtocell, picocell, and DAS applications. Attendees will gain experience using tools and equipment required for splicing, cable preparation, cleaning and inspection, OTDR, return loss, and optical loss testing.

**Audience:** Installers, design engineers, project managers, field engineers, or anyone who is managing or installing fiber for an antenna site

**Prerequisite:** Fiber Foundations recommended, but not required

### Course Outline

#### Classroom (2 Days)

Fiber Theory  
Fiber Types and Characteristics  
Cable Types and Characteristics  
Preterminated Cables  
Connectors  
Splicing  
Fiber and Cable Management  
Installation  
Standard Test Methods  
Restoration  
Safety  
System Design

#### Hands-on (2 Days)

**Station #1 – Cable Preparation**  
Loose Tube Cable Preparation  
Hybrid Cable Preparation  
Breakout and Distribution Cable Preparation  
Patch Panel and Splice Closure Preparation  
Mid-entry Practices

**Station #2 – Optical Loss Testing**  
Link Loss Measurement  
Transmit and Receive Power  
Visual Inspection / Cleaning  
Variable and Fixed Attenuators

**Station #3 – OTDR Operation**  
Acceptance Testing  
Reflection Testing  
Span Testing and Splice Loss  
Emergency Restoration  
Troubleshooting

**Station #4 – Splicing**  
Fusion / Mechanical / Pigtail  
Fiber Handling and Cleaving

### Certification

**ETA Fiber to the Antenna**  
Valid for four years.

### Early Bird Pricing*

- Four-day course .................. $1700
- Optional ETA FTTA exam .......... $150

*See page 20 for more information.

### Upcoming Locations

- **Dallas, TX**  
  January 22-25
- **Dallas, TX**  
  November 19-22
Certification

ETA International
Fiber Optic Installer
ETA FOI certification is valid for four years.

Early Bird Pricing*

Four-day course .......... $1700
Optional ETA FOI exam ........ $150

* See page 20 for more information.

Upcoming Locations

Houston, TX June 18-21

Fiber Optics for Oil/Gas

This four-day instructor-led course teaches how to properly design, install, and maintain fiber optics systems in petrochemical environments. Attendees will use the latest fiber optic technology and equipment to splice, connectorize, test, and troubleshoot optical fiber networks in order to increase efficiency and reliability as well as reduce costs and downtime.

Audience: Those who design, install, test, or maintain fiber networks in petrochemical applications such as offshore drilling, pipelines, refineries, and processing plants

Prerequisite: Fiber Foundations recommended, but not required

Classroom (2 Days)

- Optical Fibers and Connectors
- Fiber Optic Splicing
- Polyimide Coating Strippers
- Fiber/Cable Management
- Optical Cable Installation
- Testing, Troubleshooting, and Restoration
- Temperature/Stress Monitoring
- Fiber Optic Sensing Applications

Hands-on (2 Days)

- Station #1 – Fiber and Cable Preparation
- Station #2 – Fiber Optic Splicing
- Station #3 – Connectorization and Termination
- Station #4 – Optical Loss Testing
- Station #5 – OTDR Testing

Certification

ETA International
Fiber Optic Installer
ETA FOI certification is valid for four years.

Upcoming Locations

Call for details and pricing.

Fiber Optics for Mining Applications

This three-day instructor-led course teaches how to properly design, install, and maintain fiber optics systems in harsh environment underground and surface mines. Attendees will use the latest fiber optic technology and equipment to splice, connectorize, test, and troubleshoot mining-based optical fiber networks in order to increase efficiency and reliability.

Audience: Anyone who designs, installs, tests, or maintains optical fiber networks in harsh or hazardous environments

Prerequisite: Fiber Foundations recommended, but not required

Specifications and class dates are subject to change without notice.

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com
Online Training

Fiber Foundations

Perfect for those new to fiber, this interactive online course is the ideal first step into fiber optics for anyone new to the industry. The overview of basic theory, terminology, and key products is designed to provide a baseline on which to build more in-depth training. Whether a new employee at an organization that manufactures fiber related products, or a technician moving over from the copper world, this short e-course will introduce technical terminology with accurate, easy-to-understand language.

Course Pricing

Online course ............... $95

BICSI: 1 ITS CEC

Single-mode Technology: Theory and Fibers

This interactive online course covers topics that go beyond the fundamentals. Communications today depend on single-mode fiber, from backbone infrastructure of voice, data and video wireline networks to most wireless networks. This e-course offers a deeper understanding of optical theory as it applies to single-mode fibers and systems, making it critical to anyone working in the fiber optic industry.

Course Pricing

Online course ............... $99
Staff Development Videos

These staff development training videos were designed for anyone looking for a flexible and convenient way to learn about fiber optic technology and various products. Each video covers a specific topic using an assortment of video clips, animations, and graphics to provide key technical concepts and hardware information. Order and watch online—or buy in DVD format to watch without the need for a high-speed Internet connection.

The videos may be purchased individually or as a set. Detailed descriptions and previews can be found at www.lightbrigade.com.
Certifications & Discounts

Light Brigade Certificate of Completion
This certificate of completion is awarded to anyone who completes a Light Brigade instructor-led training course. Signed by the course instructor, this certificate specifies the content and total number of instructional hours for both classroom and hands-on skills training and each is uniquely traceable to the class attended.

Independent Certifications
Many Light Brigade training courses are eligible for independent certification through third-party industry organizations and groups. These certifications show competency in hands-on skills and technical knowledge. See individual course pages for more information.

Third-party Credits
BICSI Continuing Education Credits (CECs), IMSA CECs, InfoComm RUs, and NCTI Master Technician credits are available for many Light Brigade training courses.

Training Discounts
Light Brigade offers a variety of discounts and special pricing. Look for the green tag icon next to courses that are eligible for any of the discounts below:

• 10% discount for multiple attendees from the same organization.
• 10% discount for USTelecom members.
• 15% discount for UTC and FBA members.
• 25% discount for previous attendees of our three or four-day courses. Good for four years!

Note: Discounts cannot be combined.
CONA and CFCE courses are only eligible for the 10% multiple attendee discount. Other discounts do not apply.

GSA Pricing Available
(Contract #GS02F0012R)

Early Bird Pricing
Receive $150 off list price by registering more than 14 days prior to the start of class. Classes booked 14 days or less will be charged full list price. Book early and save!
Combine Early Bird Pricing with one of our many discounts for additional savings!

Specifications and class dates are subject to change without notice.

For training, tools, or equipment:
206.575.0404 • 800.451.7128
www.lightbrigade.com
Top reasons to buy from Light Brigade

1. **Expertise:** We know fiber optics inside and out. It’s all we do!
2. **Tools & Accessories:** Comprehensive tool kits designed for field use.
3. **Partnerships:** We work with the leading suppliers in the industry.

Need Products? Call Us!

Specifications and class dates are subject to change without notice

For training, tools, or equipment:

206.575.0404 • 800.451.7128

www.lightbrigade.com